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Wages Restraint

THE Trades Union Congress at its annual meeting at Douglas last week declared itself in favour of the cautious and comparatively innocuous nationalisation policy proposed by its General Council, which beyond water supply and gradual extension of public ownership of land makes no definite proposals for further nationalisation. On the question of wages it defeated a proposal by the Electrical Trades Union, which, for political reasons, is at variance with the T.U.C. General Council, that the Congress should declare its complete opposition to wages restraint and campaign vigorously for higher wages; but it showed little sense of realities when it approved a resolution which rejected any form of wage restraint which might interfere with the freedom of collective bargaining and independent arbitration, and urged the General Council to force the Government to stabilise the cost of living. The resolution adopted shows slightly more moderation, in that it does not rule out restraint within the trades union movement. Wages restraint, however, means self-restraint, and it is inconceivable that the present Government, however often it may feel compelled to issue statements on the desirability in the interests of the national economy of not raising wages, would take any active steps to do more than discourage wage demands, or intervene unasked in any negotiations. The

T.U.C. resolution means very little. At this moment the railway unions, which in their membership embrace a substantial part of the wage-earning population, are proceeding with the next stage of pressing their demands for 15 per cent wage increases rejected earlier this week by the Railway Executive, as described on another page. This is not wages restraint, and on this occasion the Government naturally has taken no official action to discourage the railway unions in making and pressing their demands. If the claims of the three principal railway unions for a 15 per cent increase were met in full the additional cost to the railways would be £39,000,000 a year; but even if a compromise is reached, the heavy extra annual cost must result in increased railway charges with their inevitable effects on prices. In such circumstances it is absurd to speak of compelling the Government to stabilise the cost of living.

The Institute of Transport

FOR a number of years it has been the pleasant custom for the President of the Institute of Transport towards the end of his year of office, to invite Editors of the transport Press to luncheon, and at that function to thank them for the help and interest they have accorded him. Mr. C. T. Brunner presided at the luncheon this year which was held on Monday last, at the headquarters of the Institute in Portland Place. He was supported by the officers of the Institute, a number of past Presidents, and Members of the Council. Mr. G. Mackenzie Junner, the Editor of *The Commercial Motor*, responded on behalf of the Editors to the President's speech and expressed the continued interest and support for the proceedings and objectives of the Institute by all those who had the duty of reporting and commenting on transport affairs. Mr. Brunner also introduced Mr. John Elliot, Chairman of the Railway Executive, who is President-Elect of the Institute. Mr. Elliot, in a characteristic speech, referred to his early association with the Press, and said that some, indeed, still regarded him as being on loan to the railways from Fleet Street.

More Dieselisation in Ireland

CORAS IOMPAIR EIREANN has lost little time since the floating of the £2,500,000 transport development loan in May in inviting tenders for diesel locomotives. It may be recalled that a complete changeover to diesel working, estimated to cost £3,000,000 over a term of years, was put forward in a submission by C.I.E. to the Government as being one of the chief ways of restoring the solvency of the undertaking. The savings in operating in five years alone would, it has been estimated, compensate for the outlay. As will be seen from details of the tenders which are given on another page, three types are specified, including two batches of mixed-traffic locomotives, of which one is to be of 1,100-1,400 b.h.p. and the other of 550-700 b.h.p. The locomotives may be diesel-electric or diesel-hydraulic. The two mixed-traffic diesels which C.I.E. already has in service are of 915 b.h.p., with electric transmission, and there are also five diesel-electric shunting locomotives of 500 h.p. The undertaking also has on hand some Sulzer oil engines and Metrovick generators of 915 h.p. awaiting incorporation in mixed-traffic locomotives yet to be built.

Influencing Transport Legislation

WHEN the Transport Bill was published in 1946, the Central Committee of Transport Users was formed to represent industrial and commercial interests, and managed to bring about certain amendments to the Bill, notably in eliminating proposed restrictions on "C"-licence vehicles. After the Bill became law in 1947, the committee went into abeyance. It was reconstituted last year with Sir Leonard Browett as Chairman, on the publication of the White Paper on transport policy. Its activities during the discussion of the Transport Bill enacted last May are outlined by Mr. S. J. Bennett, Head of the Federation of British Industries

Transport Department and Secretary to the Central Committee, in the *F.B.I. Review* for September. Besides the Federation, the bodies represented on it included the National Union of Manufacturers and the National Farmers Union, and the committee is a purely unofficial body representing industrial interests and concerned with legislative policy, unlike the transport users' committees set up under the Act of 1947, concerned mainly with services provided. Mr. Bennett shows how the committee successfully opposed use of the transport levy as compensation to the railways, and how it supported clauses in the Act increasing the freedom of the railways in quoting charges, but so as to protect certain classes of trader. The actual amendments it achieved were few, but of great importance. The Minister of Transport, Mr. Alan Lennox-Boyd, has since asked that the committee remain in being for consultation during the first stages of the disposal of road haulage assets and of reorganisation of the railways.

Overseas Railway Traffic

CANADIAN Pacific gross earnings for July at \$3 to the £ were £13,912,000 and net earnings £867,000, the corresponding figures for last year being £13,064,000 and £780,000. Aggregate gross earnings for the seven months from January 1 were £91,074,000 against £87,106,000 in 1952. The fall of C.P.R. earnings behind forecasts was the subject of editorial comment in our issue of September 4. Canadian National operating revenues, all inclusive, for July were £21,004,000, and net operating revenue £1,879,000. In July, 1952, revenues were £18,575, and net operating revenue £733,000. Aggregate operating revenues from January 1 to July 31 were £136,596 and net revenue £5,699,000, the corresponding amounts last year being £128,910,000 and £5,836,000. Gold Coast Railway traffic for July were £287,828, an increase of £26,905 compared with 1952-53. Aggregate traffic from April 1 to July 31 are £1,358,853, against £1,181,034 last year.

Stainless Steel Coaches

THE value from the maintenance aspect of stainless steel coach construction is confirmed by an examination made recently by the Reading Railroad, U.S.A., of its "Crusader" train, which since its introduction in November, 1937, has been making two double journeys in each direction daily over the 91½-mile Reading main line between Jersey City and Philadelphia. After fifteen years' service the five-car train came into the shops for overhaul, and was stripped completely. The structure of each car is in the form of a modified truss, with the roof and underframe serving respectively as compression and tension chords; the end underframes are arc-welded units riveted into the car structure, and the floors are corrugated stainless steel, with transverse corrugations welded to the underframe longitudinals with intermediate reinforcing plates at the points of greatest stress concentration. No deterioration of any kind was found except on various attachments to the car structures and on certain partitions in the restaurant car. The latter had become corroded by leaks from the refrigerators.

Diesel Trains for West Cumberland

ADVOCATES of diesel traction in this country have complained that the railways, by not selecting complete areas in which to substitute diesel for steam working, have not given this form of traction a fair trial or gained the full benefits which it can confer. In 1946 the Southern Railway came out with a bold scheme to complete electrification of all remaining steam main lines in Kent, Surrey and Sussex and operate with diesels all other lines in the area not already electrified. Nationalisation, limitation of capital expenditure, and other factors have not made it possible to carry out this scheme, but the advantages which may follow dieselisation of suitable lines or in suitable districts have nevertheless not been lost sight of. Last November British Railways announced that £500,000 was to be spent on building lightweight diesel

trains and that the first would be put into service in the West Riding. It is now stated that the experiment is to be extended to West Cumberland, at a cost of £330,000, and details of the new scheme, which will enable a much increased service to be given, appear elsewhere in this issue. The district selected is one which includes both industrial and holiday traffic and should provide an excellent test of the adaptability of multiple-unit diesel working which will be watched with interest.

Renewing a 755-ton Swing Span

THE Great Northern Railway of the U.S.A. has replaced the 368-ft. swing bridge near Anacortes in an interesting manner and with only one day's interruption of rail traffic. The new through span, consisting of Warren trusses with verticals and weighing 755 tons, was fabricated at Seattle on piles driven in tidal water. When fabrication was complete, all but the central and two end pile-bents were removed, and two 120-ft. barges were floated in under the span; on a rising tide they lifted it clear of the piles. With the aid of three tugs, it was manoeuvred into Puget Sound and towed 80 miles to Anacortes, the route including the difficult Deception Pass race. By previously building a new pivot-pier half the length of the new span from the old pivot, the engineers were able to lower the new span—on the first falling tide—on to the new pivot pier transversely to the railway centre line, while the old span remained swung transversely on the old pivot pier. On a rising tide the same day, the old span was lifted by the barges ready to be towed back to Seattle. The old pivot pier then became an end pier for the new span, with but little modification.

Forgetting the Other Train

A NOT uncommon cause of accidents at level crossings, more especially at those of the occupation type or where, as seen abroad, light signals alone are provided, is the starting of a vehicle immediately a train has passed, the driver not realising, or forgetting, that another is approaching from the opposite direction. Occasionally this mistake is made by railway staff at the gates, as in the case of the Riccall accident of July 16, 1952, inquired into by Colonel R. J. Walker, whose report is summarised in this issue. The gatekeeper, who had cleared all his signals, was well aware that both an up goods and a down express were approaching. Two motorcars came up, and when the goods train passed, the gatekeeper, momentarily forgetting the express, restored all signals and opened the gates. Realising his blunder he called out and beckoned to the leading car, intending to hurry it over, but its driver stopped on the line, probably misinterpreting the gatekeeper's signs. The vehicle was destroyed and both the occupants were killed. The gatekeeper, well spoken of by his superiors, could not account for his lapse. A charge of manslaughter was sustained against him successfully, today a very unusual sequel to a railway accident.

Power Signal Wiring in India

HOW strongly local conditions affect the methods to be adopted in installing power signalling, with its extensive amount of cabling and wiring, is illustrated in the article in this issue by Mr. H. C. Towers, Chief Signal & Telecommunications Engineer of the Western Railway of India. It is in the details of equipment, of which cabling and wiring form a vital part, that progress under the impact of new ideas, has been so noticeable of recent years. The result has been to reduce the chances of failure and make it much easier to find and rectify a fault should one occur. Much more care is now given to fitting apparatus in such a way as to render it easy to watch its working and change any item quickly, should necessity arise. More thought is given to the design of signalboxes and to providing separate relay rooms, where apparatus can be well spaced and connections systematically arranged. In India, and of course elsewhere overseas, climatic conditions necessitate special atten-

tion being given to apparatus housing out on the line, to enable equipment to be examined without risk of damage in the heavy wet weather regularly met with.

British Railways Class "2" Standard Tank Engines

IN conformity with British Railways' policy of standardisation of locomotives to reduce manufacturing and repair costs, the most recent of British Railways standard tank engines to be completed, the class "2" has much in common with the class "3" described and illustrated in our issue of May 23, 1952. The first of the new type has been completed at Crewe. Twenty are under construction, and will be employed on London Midland branch-line passenger services now worked with 2-4-2 and 0-4-4T type engines which will become obsolete as the new engines become available. The parent office of its design is Derby, but Swindon, Brighton, and Doncaster also have contributed to the design of many details. To enable the engines to work push-and-pull trains, vacuum-controlled auxiliary regulator valves are fitted in each steam pipe, operated by a system of mechanical linkage from the rear of the train by the driver. The engines have a tractive effort of 18,513 lb., and weigh 63 tons 5 cwt.

Equipping Belgian Radio Trains

THE popularity of excursion trains with facilities for broadcast announcements and entertainment has led the Belgian National Railways to allocate apparatus vans to each district of the system. Loudspeakers for installation in the coaches of any train are stored in the vans, and simple electrical connection arrangements are provided between the van and the stock to which it is attached. Each of the special vehicles is equipped with a 4-waveband receiver, tape recorder, microphone, amplifier, and associated apparatus. Fifty 3-watt loudspeakers are stored in each van, sufficient to equip a 10-coach train. The vans have a normal 24-volt electrical installation for lighting, which is also available, if necessary, for supplying the radio apparatus. Normally, however, the latter is fed by either of two separate high-capacity accumulators in conjunction with a rotary-converter to provide a.c. Each van is equipped with a copper oxide rectifier for charging the radio batteries from an a.c. source, and also with sockets for connection to the d.c. supplies which are available at stations and can be used for charging purposes without requiring the rectifier. With this system demands for radio facilities can be met without having to send equipment and technical staff from district to district.

Route Map for Boat Train Journeys

A RAILWAY journey without notable scenic features may still be a source of pleasure to those familiar with the geographical and historical background of the route. Travellers to this country by Canadian Pacific "Empress" liners are now presented with a route map folder showing places of interest to be seen from the "Empress Voyager" boat trains between Liverpool Riverside and Euston. This has been produced by the Canadian Pacific Railway in conjunction with the London Midland Region under the title of "Your Journey to Euston." In addition to the usual topographical information, certain railway features are pointed out, such as points where other routes connecting places well known to overseas visitors are crossed. The bridge south of Roade carrying the Ravenstone Wood-Towcester line is included presumably for the literary associations of Stratford-on-Avon and Bedford, which it connects, but the only personality from literature mentioned by name is Tom Brown, who is bracketed with the railway junction at Rugby. Apparently Thomas Hughes commands a wider readership in Canada than Doctor Johnson, whose birth-place of Lichfield is passed without a reference to him or his works. Another omission surprising to British travellers is the Staffordshire stream associated with the Compleat Angler, a name probably made as familiar to many of them by "The Track of the Royal Scot" as in the pages of Izaak Walton.

Mr. R. A. Riddles

THE qualities and experience which Mr. R. A. Riddles, who retires at the end of this month as Member, Railway Executive (Mechanical & Electrical Engineering), a position he has held since the formation of that body in 1947, brought to and has displayed in that position are those required in the most responsible railway mechanical engineering post held by one man. An outline of his career appears in our personal columns. He has combined technical qualities with a popular personality. His duties have included the fusion of the mechanical engineering departments of the four main-line companies and co-ordination of their works facilities; a major part in the determination of motive power and electrification policy and standardisation; responsibility for locomotive, carriage, and wagon design, construction, and maintenance on British Railways, and rehabilitation of locomotives and rolling stock damaged or under-maintained as a result of the war; and research and experiment in developments such as the gas turbine, dieselisation, and 50-cycle electric traction, besides his share of corporate responsibility as a Member of the Executive.

At Crewe, where he served his apprenticeship, Mr. Riddles was trained in the combination of L.N.W.R. tradition and modern ideas and practice characteristic of Bowen-Cooke, the Chief Mechanical Engineer. After service in the first world war he enlarged his experience at Crewe in matters such as housing, the progressive system for locomotive repairs, and works reorganisation. On the amalgamation of the L.Y.R. with the L.N.W.R., and later in the service of the L.M.S.R. after grouping, he gained further experience under Chief Mechanical Engineers from other railways: Hughes from the L.Y.R., Fowler from the Midland, and Sir William Stanier from the G.W.R., being appointed Principal Assistant to the last-named before he obtained what was largely an independent command as L.M.S.R. Mechanical & Electrical Engineer for Scotland in 1937.

The war of 1939-45, on the outbreak of which his services were placed at the disposal of the Ministry of Supply, saw him Deputy Director General, Royal Engineer Equipment, with a multiplicity of stores and their design in his charge, including the Bailey and Everall bridges, and the Mulberry harbour. He was largely responsible also for the design and provision of over 1,000 "austerity" 2-8-0 and 2-10-0 type standard-gauge W.D. locomotives used at home and in overseas theatres of war, besides other types for service overseas. The L.M.S.R., to which his services were returned at its request in 1943, forthwith promoted him Chief Stores Superintendent, so affording him experience which later was to prove of the utmost value, and in 1946 he became one of its Vice-Presidents.

The best known of Mr. Riddles' activities since nationalisation is perhaps his responsibility for the development of the standard designs of British Railways locomotives and rolling stock. Besides this he has been active in many aspects of his professional sphere. His many services have been recognised in the award in 1943 of the C.B.E. for his work for the Ministry of Supply, and his election to the presidency in 1950-51 of the Institution of Locomotive Engineers and the award last July of the Gold Medal of the Institution.

Nyasaland Railways

THE report of Nyasaland Railways Limited for the year ended December 31, 1952, received from Mr. W. M. Codrington, Chairman & Managing Director, shows a steady annual increase in goods tonnage and an increase in passenger traffic. Besides the dividends received from the subsidiary company, the Central Africa Railway, amounting to £31,500, the earnings of the Zambesi Bridge and its South Approach amounted to £59,483 and £5,736 respectively, making a total of £96,719, compared with the 1951 figure of £78,269. After providing £56,000 for interest on the 3½ per cent first debenture stock, £79,719 was paid as interest on the 5 per cent consolidated income debenture stock, which is equivalent to a payment at the

rate of 2½ per cent, compared with 2 per cent for the previous year.

The following are some of the principal results of working the Nyasaland Railways, excluding the Central African Railway Company:—

	1951	1952
Goods tonnage (railway)	228,671	278,782
Passenger journeys (railway)	285,266	316,547
	£	£
Goods receipts	446,233	474,639
Livestock and vehicle receipts	3,236	3,380
Passenger receipts	74,209	89,979
Baggage and parcel receipts	12,917	11,483
Gross receipts (including road and lake services) ...	583,594	652,843
Working expenses (including road and lake services)	458,240	547,443

Very satisfactory progress was made with the reorganisation of Limbe workshops and greatly improved facilities are now available for the inspection and overhaul of locomotives and other rolling stock. Carriage and wagon maintenance costs have remained steady, but many new passenger coaches and goods wagons have been acquired which at present require little attention, while costs of keeping older stock in service are increasing.

During the first part of 1952 a number of new passenger coaches were delivered and have been added to the pool of rolling stock which operates in conjunction with the associated company, the Trans-Zambesia Railway. The five tank cars ordered the previous year were delivered and the 30 covered bogie wagons are expected to be shipped in October. The two modern diesel passenger trains which have been on order for service between Limbe and Beira will not be ready for shipment until March or April next.

The lake services continued on an unremunerative basis; the tonnage carried last year, 7,857 tons, declined from the previous year's figure of 8,255 tons and the revenue earned was only £24,664 against expenditure, including provision for renewals of £68,523. The new vessel *Ilala II* ran to schedule steadily; and by means of the newly installed navigation lights on Lake Nyasa and a network of wireless stations the time for the round trip was cut from ten to seven days. The floating dock was finally completed at Monkey Bay in March this year, and the *Ilala II* has been successfully dry-docked for inspection.

While there is yet no sign of mineral development in Nyasaland on a scale which would materially affect receipts, the plans of the Nyasaland Government for the expansion of agricultural production seem likely to yield a considerable tonnage, though of low-rated commodities, in the next few years. As existing resources, not only in rolling stock but in ancillary facilities such as running loops, and so on, were likely to prove inadequate for the increased tonnage anticipated by the Nyasaland Government, the latter has agreed to finance the capital expenditure necessary to enable the railway to handle these developmental traffics. Discussions on this matter are in progress, and orders for the additional rolling stock required have been placed. Meanwhile the services continue to improve. For instance, goods handed to the Trans-Zambesia Railway at Beira are usually available to the importers at Limbe within 30 hr.; and despite the great increase in maize traffic, overseas exports such as tobacco and tea have been expeditiously handled.

The report states that the only immediate effect on the railways of the federation of Northern and Southern Rhodesia and Nyasaland is that the powers hitherto exercised by the Nyasaland Government and their right to terminate the concession will pass to the Federal Government. It seems hardly likely, however, that the new Government will buy out the Nyasaland Railways, as the capital required could be more profitably employed in direct development of the country rather than replace the British capital already invested. If the right of buying out were exercised, the portion of the Nyasaland-Beira route which lies in British territory might be amalgamated with the Rhodesia Railways; and it is sometimes argued that, if this were done, the Rhodesia Railways charges would be applied in Nyasaland and considerable operational and administrative economies would be achieved.

Whilst the Rhodesia Railways, it is argued in the Nyasaland Railways report, with their much heavier traffic and longer hauls can in many cases afford to charge lower rates than those charged by the Nyasaland Railways, it is doubtful whether the Rhodesia Railways and their customers would be willing to subsidise rail transport in Nyasaland to make good the loss resulting from a reduction of rates. Moreover, any reduction in rates resulting from amalgamation would only apply on that part of the system which is in British territory, that is to say, on roughly half the total distance between Salima and Beira. There is also little scope for securing administrative and operating economies by this means, as the Nyasaland are separated from the Rhodesia Railways system by some 400 miles of railway in Portuguese territory.

Research on Indian Railways

THE research organisation of the railways in the Republic of India which previously functioned under the Central Standards Office for Railways, has lately been separated and placed under a Directorate of the Railway Board with its main centre at Lucknow and its two sub-centres at Lonavla and Chittaranjan. Its main objectives are maximum safety in rail travel, sufficiency in equipment, and economy. Good progress already has been made; statistics have been compiled and research centres set up at Lucknow, Lonavla and Chittaranjan.

The Lucknow centre carries out research on fuel, the dynamic effects of vehicles on track and bridges and riding quality and performance lists on locomotives and carriages. The documentation of information received and summaries of important researches from at home and abroad is to be undertaken and bulletins on findings are to be issued. The sub-centre at Lonavla is carrying out research on soil mechanics and foundation engineering problems; chemical and metallurgical studies on lubricants, paints, water softeners, and other aspects are being undertaken at Chittaranjan.

The Research Controlling Committee, which represents leading technical and administrative heads of the railways, has drawn up a priority research programme. Any problem dealt with by the committee must, firstly, be of immediate importance to the railways from the point of view of technical and operating safety, efficiency and economy; and secondly, it must be of a nature which prohibits its investigation by any other national laboratory in India.

Concrete results have materialised from the research work already carried out by the new research organisation. It has enabled the design section of the Central Standards office to improve the riding qualities of locomotives and has provided valuable data for designing "WP" and "WG" class engines now being manufactured at Chittaranjan. An oscillograph car constructed in 1935 under the aegis of the Railway Board and equipped with the latest types of recording instruments, has facilitated research on thrust, stresses and strains, haulage speeds, and the behaviour of the soil under fast moving heavy loads. A dynamometer car was acquired later by the Railway Board, and other mobile test units such as a fuel test car and a track recording car.

The effect of locomotives on bridges and track has been assessed with a fair degree of accuracy; and it has been possible to retard premature replacement of rails, many of which had begun to fail. Investigations into the behaviour of black cotton soil have yielded valuable data and may solve the problem of building on this type of soil. Similarly, it was possible to diagnose the cause of the constant sinking of some of the Godavari bridge piers which had been a source of anxiety to the engineers for over half a century. Information has been gained on the problem of low-grade locomotive coal; experiments have evolved a suitable type of fire grate for efficient burning of this lower grade coal, thus preserving the supply of higher grade fuel, so urgently needed in other industries.

As to self-sufficiency in equipment the main problem before the Research Directorate is how to make use of

indigenous materials such as aluminium, which is available in plenty in India, as a substitute for imported zinc and tin. Also, instead of importing tannins for water treatment, techniques have to be developed for using the locally produced tannins. Attempts are also being made to find indigenous substitutes for other proprietary stores at present being manufactured abroad.

A Plea for Mechanical Locking

ON the occasion of the recent inspection by members of the Institution of Railway Signal Engineers of installations of the remotely controlled power operated lever system on the lines of London Transport Executive, the Signal Engineer, Mr. R. Dell, to whom the system is due, expressed the view that mechanical interlocking possessed certain advantages which it seemed a pity to forgo, and that there appeared to be room for developing it in such a way that certain objections that have been considered to attach to it could be eliminated. As is well known, the power lever frame was derived from the much older mechanical frame, merely differing from it in the beginning by substituting some kind of force, hydraulic, pneumatic or electric, for the muscular power of the signalman, while gaining something maybe in the distance over which points and signals could be operated. It was seen then that theoretically there was no limit to the distance, but in practice there was for several reasons, technical, operative, and economic.

Interlocking had been introduced in the first place to prevent mistakes by the signalman. It obliged him to work in a pre-determined manner and no other, but what it did was to interlock the levers working the various appliances out on the line, not those appliances themselves, although in fact that was what was required. As, however, the force which moved them came from the signalman himself the locking of a lever did mean that, short of some out of the way circumstance, such as malicious interference, no effort could be exerted on them irregularly. With well-made equipment, properly maintained, there was reasonably sufficient certainty that the outside function and its lever were in agreement, essential for the interlocking to have full value. The fact, however, that facing points might not, for some reason, be completely in accord with their lever was fraught with such serious possibilities that what came to be called detectors were added, to reveal any such situation and prevent the exhibition of a false clear indication at the junction signal.

In the case of power frames the interlocking could prevent the signalman from switching on the power to a function irregularly, but there remained the possibility that some defect, such as a cross connection of wires, or mistaken action by maintenance staff, might result in power finding its way to a function independently of the lever, thus defeating the locking. From this sprang the numerous circuit designs intended to safeguard against any irregular energisation and which were applied in a number of installations, although we think their appeal is no longer what it was. The principle was still the same, that concordance between the lever and function had to be maintained or any want of it be revealed immediately and rendered harmless. In some of the first power installations, however, not much attempt was made to do this. Reliance was placed on a so-called return indication, which either allowed the lever, stopped part way, to be moved to the end of its stroke, or actually placed it there automatically, thus liberating the mechanical locking, risk of subsequent interference with the outside function being regarded as sufficiently remote, but later continuous detection of at least facing points was added.

The worst accident in Great Britain arising from discordance between lever and function was that at Lichfield on January 1, 1946, when facing points were held fully reversed by a local defect, but the signalman succeeded in bringing their lever fully to normal by buckling a downrod at what proved to have been a hitherto un-

known weak point, so defeating the locking. He was then able, most unfortunately, to reverse the home signal lever against the connection from the detector and in consequence to reverse his distant signal lever, producing a false clear indication of the most dangerous kind and leading to the home signal being overlooked by the oncoming driver.

Although the provision of interlocking involved a very simple principle many complicated mechanisms were constructed to give effect to it and their history makes a long story. In this country, however, and where British influence has prevailed, the plain reciprocal wedge motion of Stevens now commands the field. Mr. Dell's remarks, while susceptible of wider application, bore reference more particularly to the type of locking seen in the power frames used by his Executive and, as he said, found to be probably the most reliable piece of signalling equipment, and the least expensive to maintain in service on its lines. It came to this country from America at the turn of the century, with the electro-pneumatic installation at Bishopsgate, G.E.R., still in use, and is really the Stevens wedge principle in re-arranged form. It had been applied to mechanical locking frames in the U.S.A. under the name of "improved Saxby and Farmer" locking, because arranged to be worked by the rocker motion and drive introduced by that firm here in 1871-1874. It became standard for electro-pneumatic frames here and thus found its way to the London underground lines, but was never, we believe we are safe in saying, applied to a mechanical frame in this country.

That properly constructed mechanical locking is a simple, positive and dependable means of preventing conflicting signalling operations from being initiated will be generally admitted, and if it is not used something else must be provided to perform the same indispensable functions. Even if the handles, buttons, etc., actuated by the signalman are not locked at any time, as in modern "panel" installations, the purposes mechanical locking is designed to fulfil must be carried out by other means; interlocking eliminated in one form must re-appear in another. Some who, like Mr. Dell, have retained the individual lever system of power working have, however, replaced mechanical locking by electrical, the signalman's way of working remaining unaffected, and claim certain advantages for that, such as the elimination of much special fitting and greater ease of carrying out alterations. In the remotely controlled power operated lever apparatus the methods of working long proved satisfactory on the London Underground lines are retained complete, the signalling side of the equipment being unaltered, but direct operation of the levers by the signalman is replaced by a pneumatic drive, set in action from a distance. In the latest example the signalman merely presses a button to initiate and complete the setting of an entire route. The mechanical locking remains, to prevent any conflicting action taking place in the "signalling" portion of the equipment.

Mr. Dell threw out the suggestion that by using a few standardised elements manufactured under modern repetitive processes it might become possible to produce a form of locking able to be readily assembled and applied—or altered on site—with the aid of very simple tools and no special fitting, so that the advantages of mechanical equipment, in his view appreciable, might be had without any of its inconveniences, or what some look on as such. The elaboration of this idea certainly would make a very interesting study and might be applied to the design of mechanical lever frames, beyond what has been done hitherto. The thought recalls the policy adopted by F. W. Webb on the L.N.W.R., who considered that locking frames should be made with as much care as a locomotive, special machinery being used to cheapen production. He would have been more successful than he was had the necessity of avoiding certain patents obliged him to use a form of locking which, even when very well made, could not give the lasting reliability of the wedge motion and a drive from the lever difficult to keep in perfect shape. Had Webb been able to apply something like the American "improved Saxby and Farmer" we think the result would have been very different.

LETTERS TO THE EDITOR

(The Editor is not responsible for opinions of correspondents)

Electric Traction Systems

August 31

SIR,—With reference to my letter in your issue of August 28 on low-voltage systems being more favourable to intensive suburban operating conditions, I presume that your remarks are based on present practice.

Most of the 600-V. d.c. systems were adopted at a time when high-voltage d.c. systems were not considered a practical proposition.

Actually the densest suburban service in Great Britain is operated with high voltage d.c., namely the Liverpool Street to Shenfield section of the Eastern Region of British Railways.

Your faithfully,
LIONEL CALISCH,
M.I.Mech.E., A.M.I.E.E.

116, Avenue du Pesage, Brussels

Local Booking Facilities via Dover

September 5

SIR,—In the Southern Region winter timetable, as in previous issues, Dover Marine appears in Tables 20 and 28 and in the index, yet no local train seems to call there. After the war it was stated that because of bomb damage it was not possible to restore the local services for the time being, and only boat trains could be dealt with.

Seven years have passed and the damage has all been made good, yet still we have the name of the station but no trains. Passengers from local stations to the Continent still have an awkward bus journey from the Priory to the Marine Station, or go by taxi.

Before the war many local trains called at Dover Marine. Through tickets from Southern Railway stations were issued, with through baggage registration facilities in many cases. None of these facilities has been restored.

Other carriers are more enterprising. The East Kent Road Car Co. Ltd. operates coaches to and from Marine Station with through tickets to the Continent from any point at which they pick up. Similarly, B.E.A. will give you a through ticket from Aberdeen to Nice or Shetland to Paris. What a pity British Railways retreat while others advance.

Yours faithfully,
G. HAFTER

107, Mortlake Road, Kew, Surrey

Collisions

September 7

SIR,—Apparently, the Nottingham accident, the report on which was summarised in your issue of August 28, is another of the many collisions through failure to recognise that there must be two stop signals between one train and the next. The Inspecting Officer says, "The over-running may have been due to mismanagement by the driver, or partial brake failure, or both." But if the distant had been a stop signal he would have tested his brake long before reaching it, and then proceeded more slowly to the station ready to stop on the dot. If the distant were properly operated, there should be no need for more than three signals, the distant, home, and starter; but in the diagram seven or eight different signals are shown.

Many of the old school of railwaymen were dead against introducing more signals; many more passenger trains were then run on time, and at a higher rate of speed. Since the original amalgamation this policy has been completely reversed. All sorts of new signals and electrical devices, each with its bells and paragraphs of instruction, only confuse signalmen and drivers; far from helping to reduce accidents, the number is now quite extraordinary compared with before 1914.

In the Manchester collision a fuss was made because the

signalman did not ring the approach signal, which was merely an unnecessary repetition of the "Train entering section" signal. The only question the signalman need have been asked was "As the steam train was booked to run ahead of the electric train, why was it that all signals were not at danger against the latter?"

The management should now get back to the old efficient and straightforward methods, by cutting out all these outer distant, outer homes, electrical devices, bells and instructions, so as to relieve the signalman's mind of all of them.

Although your article "Approach Warning or Stop Signal?" in your issue of September 4 claims that a distant stop signal would slow down the working, it overlooks the fact that the average speed of our trains is only about half that of other countries, because lines are overcrowded with numbers of very lightly loaded trains, involving signal delays. Many passenger trains consist of only three or four coaches, which would be doubled or trebled at half the present fares. In freight traffic seven or eight little trains now carry the traffic of one American train running at twice the speed. That is why lines in U.S.A. are mainly single track. In South America, I had often known over 30 coaches and vans in a train, and sixty 40-ton wagons on goods trains travelling at a higher speed than our trains.

The article also says that it would be out of the question to expect a driver running at speed to be ready to stop at a signal without adequate warning. He should, however, have been warned by the box in the rear, usually by checking him at the starting signal. There is no reason to assume that enginemasters as good as any in the world would totally disregard signals, when it is their prime duty to watch for them on approaching stations. Even in a fog, they have plenty of landmarks. If it is thick, their duty is to slow down to walking pace until they find the signal; I have known abroad of the fireman having to climb the signal ladder to discover its position.

Yours faithfully,
E. R. B. ROBERTS

Eynesbury, Huntingdonshire

Southern Region Headboards

September 4

SIR,—I was interested in the article on page 270 of your September 4 issue, which prompts me to ask why, in the summer, nearly every train leaving Waterloo for the West of England between 10 and 11 a.m. is fully labelled "Atlantic Coast Express" with the one conspicuous exception of the officially designated titled train. The engine headboard is similarly carried by any locomotive but the correct one.

The same trouble does not exist in the up direction, for the line of least resistance is adopted by naming practically every train "Atlantic Coast Express" and the trouble of changing roofboards thereby is eliminated.

Yours faithfully,
IAN ALLAN

Craven House, Hampton Court

The Trains of Tomorrow

September 4

SIR,—Mr. R. Bell, in your issue of September 4, condemns electrification as a result of experience on one small and rather specialised scheme (Manchester—Sheffield), and on U.S.A. railways, where both operating and financial conditions differ greatly from those in this country. Continental practice is surely a safer yardstick.

As electrification of all main lines must be a long-term project, it should be considered in conjunction with future possible fuel supplies and costs. The only foreseeable way in which atomic energy could be generally used in com-

merce is by employing it to generate electricity; the most economical way to use coal is as a chemical plant raw material, with by-product heat energy used for electric generation at pit-head power stations and any future hydro-electric or tidal power stations will add to the national generating capacity.

Diesel or gas turbine engines for shunting and low-intensity services are probably most desirable; what is needed here is a railcar engine of some 350-400 h.p. suitable for underfloor mounting, like the Breda or Saurer—O.M. "flat twelves."

British Railways should cease to build steam locomotives, replacing over-age machines by diesel locomotives, which would be concentrated in one area as a full scale experiment. The diesels would have a useful life before electrification could be completed.

Yours faithfully,

J. RODGERS

The Cottage, 132 Worrin Road,
Shenfield, Essex

Branch Line Closing

September 2

SIR.—The closure of the Bembridge branch in the Isle of Wight can be understood. So short a branch cannot hope to compete with road transport, unless the latter is plainly

inadequate for the traffic offering. Closing the Newport to Freshwater line is another matter. The branch provides the only rail service to the western end of the island. On a recent tour trains were very reasonably filled. Has sufficient thought been given to the congestion of the narrow Isle of Wight roads if all passengers are forced to go by bus?

I wonder why the Railway Executive seems to have adopted such a policy of defeat. If a line does not pay, close it down. Surely, if your goods do not sell, make them more attractive or cheaper. To the general public the Island railways appear out-of-date. They have one advantage over the roads, for the country they traverse is not spoilt by ribbon development. Observation type diesel railcars, adequately advertised, would regain much passenger traffic.

Closure of so many railway lines throughout the country must reflect on the traffic on the main routes. It is such a pity to get the public out of the habit of travelling by rail. Only this summer I found cases in this borough of children of ten and eleven who had never travelled in a train.

Yours faithfully,

E. V. M. POWELL

M.I.Loco.E.

Chinthays, Woodside, Lymington, Hants

Publications Received

Eighth Annual Report of the Council of Industrial Design. The Council of Industrial Design, Tilbury House, Petty France, London, S.W.1. 8 in. x 6 in. Illustrated. Stiff paper covers. Price 1s. 6d.—This booklet deals with the year ended March 31, the year following the Festival of Britain, and subsequent reorganisation within the council after its participation in the Festival. The council's policy throughout the year has been to concentrate on particular sections in industry rather than a general approach; in the second half of the year it welcomed invitations from Government departments to set up committees to approve and stimulate design in particular industries. Despite a very small budget for exhibitions the council managed to carry out a useful programme throughout the year. The designs depicted in the photographs reproduced include a "Coronation Ambassador" motor-coach designed for Duple Motor Bodies Limited and a bus shelter.

The Isle of Wight Railways. By Michael Robbins. South Godstone, Surrey: The Oakwood Press. 8 in. x 5 in. 37 pp. Illustrated. Stiff covers. 7s. 6d.—Mr. Robbins' latest book makes a timely appearance. The decision to withdraw services from two more lines in the Isle of Wight on September 21—the picturesque Merstone-Ventnor branch closed a year ago—has aroused much controversy, not all of it prompted by sentiment. The Freshwater line, one of the two about to be closed, was always impecunious, though the Solent Tunnel, sanctioned in 1901, might have made all the difference to its fortunes and to those of the other lines. The incredibly complex pre-Grouping history of the Island railways is skilfully expounded by Mr. Robbins

and the illustrations well typify the variety of rolling stock and other features, mostly before the Southern Railway brought in administrative and technical order without impairing individuality. The relative sparseness of winter traffic and the ubiquity of the bus threaten the Island railways' future in these days of inflated costs. The Ryde-Ventnor line, always the best patronised, seems, however, to have a good chance of ultimate survival; indeed, it is difficult to see how any other means of transport could so expeditiously convey the persons and the impedimenta of the families who frequent the resorts in the east of the island in the summer.

Lubrication Problems.—The importance of selecting the correct grades of oil and necessary continued attention to chassis lubrication in transport and other road vehicles to reduce wear is emphasised in a brochure recently issued by Liberty Oils Limited. It deals with engine lubrication and the reasons why heavy or light oils, if used incorrectly, can result in unnecessary engine wear and increased fuel consumption. Care of gear boxes, chassis and spring gear is also dealt with, together with the uses of upper cylinder lubricant, shock absorber, and hydraulic brake fluids, flushing oils, and so on.

Solus-Schall Testing Service.—Solus Schall Limited has recently issued an illustrated booklet providing details of the company's non-destructive testing and measuring service which is available for works or site work in Great Britain or abroad. The equipment includes X-ray, gamma ray, ultrasonic, magnetic and eddy current methods, and fluorescent penetrants for the testing of ships' hulls, bridges, welded oil pipelines, pressure vessels, locomotives, and so on. Details are also given of the

technical advice available in London, Birmingham, Glasgow, and other principal cities; examinations are also conducted at the firm's laboratories at Bushey Heath and Matlock.

George Cohen Machinery Catalogue.—The first comprehensive postwar catalogue of George Cohen Sons & Co. Ltd. lists new and reconditioned plant and machinery supplied by the "600" Group of Companies. To assist intending purchasers, the source of supply is indicated, and the equipment is listed alphabetically. The catalogue is liberally illustrated and indicates capacity, principal dimensions, and so on, of the many different types of plant and equipment available.

Wade Products. Wade Engineering Limited, Gatwick Airport, Horley, Surrey. 10 in. x 8 in. Illustrated. Paper covers.—This brochure deals with a number of Wade products, including Roots-type superchargers, variable compressors, turbo-extractors, air motors, and temperature control units. There are many photographs, diagrams and tables. Since the inception of the company, research and development has been extended to the field of applied thermodynamics and the products described are some of those which have resulted from this research.

Moulded Plastics for Industry. The General Electric Co. Ltd. describes in an illustrated booklet the processes employed at their Witton Moulded Insulation Works in the production of moulded plastics. The firm has some 40 years' experience of the technique employed in producing a wide variety of industrial plastics moulded from polystyrene, polythene, and phenolic materials for fans, terminal blocks, refrigerator dip trays, and prismatic side plates for fluorescent lighting fittings.

THE SCRAP HEAP

Mistaking the Call

Mr. Donald Gordon, President of the Canadian National Railways, has said that the railway has had reports "from some animal lovers to the effect that during the mating season the bull moose has mistaken the sound of a diesel klaxon for the vocal response of an amorous cow moose—with results that have been disastrous to the male animal."

Stealing Track

The charge of theft brought recently against twelve men at Rouen for tearing up track—presumably of a siding or disused branch—with a bulldozer and selling the rails for scrap recalls a rumour of similar conduct by tribesmen in north-east India. The tribal territory is crossed by the main line of the Assam Bengal (now Eastern) Railway, and for some years, it is said, fishplates and similar material were left by the lineside for the tribesmen to turn into hunting spears, which sufficed for their needs, and nothing was stolen.

When, as an economy measure during the second world war, no spare material was left, the tribesmen, who otherwise were most friendly to the Allied cause, are said to have removed fishplates from the track of what was a busy line of communication, and this they continued to do until the old custom was resumed.

Fintona Horse Tram Televised

When B.B.C. cameramen were in Northern Ireland to film newsreel shots of the T.T. race they took the oppor-

tunity to televise the Fintona horse tram of the Great Northern Railway, whose driver was interviewed.

Real Fun

We can imagine, in the years ahead, our children's children, rambling in what quiet countryside may still have escaped the town planners and the airport builders, suddenly alighting on the remains of a long-forgotten railway—perhaps a weed-grown platform or a few twisted, rusty rails. We can see their eyes growing in wonderment and their startled exclamations as the import of their discovery becomes clear.

We can almost hear them saying, "What quaint ideas our grandfathers had. However could they have been satisfied with this?"

And, if we could, we would answer them: "You don't know what you've missed. You can keep your jet planes and your atomic cars and your noisy helicopters. When it came to real fun in travelling, the old 9.26 from Mumbleton could beat the whole darn lot of them."—From *"The Evening News."*

High Speed on the G.W.R., 1839

A letter from a French civil engineer dated October, 1839, is quoted by a correspondent, who still has the original in his possession. "In an experiment I have just made (on August 3)" the Frenchman writes "on the Great Western Railway between London and Maidenhead, we attained a speed of 55.4 English miles per hour. The experiment was performed by the

Evening Star locomotive, manufactured by Mr. Robert Stephenson, of Newcastle. . . . The last two miles we travelled over each in one minute and five seconds, which gives a velocity equal to 55.4 miles per hour."

After stressing the necessity for some sort of signalling to ensure safety with fast running, the engineer adds: "With the engine used for this experiment we were not able to go beyond the speed stated above, because the pump was not sufficient to feed the boiler, consequently we were obliged to suspend steaming and to decrease speed, until the boiler was again replenished; but there is no doubt that only by enlarging the diameter of the pump and feed pipe, we might be able to maintain the highest speed for a long distance, and even go beyond it. . . . I have made investigation into other railway speeds mentioned in newspapers, but there is no evidence that they were ever reached, so that our experiment has made a record in the annals of railways. May I say that the Great Western Railway is sensibly level? The English now lead the world both in railway engineering and high speeds."

Better by Train

One of the main pleasures of travel by rail is the absence of all responsibility. There is no mental strain. We do not experience hair-breadth escapes on every few miles of the journey, as inevitably occurs on the roads.—From a letter to *"The Daily Telegraph."*

A Tribute to "A. B."

Each Friday I hear something fall
Upon the lino in the hall;
To me it is a safety bet
That this is my *Railway Gazette*.

There may be other mail as well
From firms with something new to sell,
And other notes that fail to thrill,
Such as a most persistent bill.

Selecting then this rounded packet,
I swiftly doff its paper jacket,
And with great speed for one my age,
I open up the printed page.

The Scrap Heap is my first concern,
And to this page I quickly turn,
Then eagerly I look to see
If there are verses by A. B.

And seldom do I look in vain
For lines extolling some fine train,
Or stations, junctions, ships as well,
And also railway personnel.

It gives me therefore greatest pleasure
To wish him well in his new leisure;
Please let's have more tales from his
pen
Of railways and of railway men.

R. M.



Photo]

[J. C. Gillham

The Fintona horse tram of the Great Northern Railway Board (Ireland), restored to its original condition after an accident

OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

CEYLON

Estimates for 1954

The estimates of the revenue and expenditure for the financial year October 1, 1953, to September 30, 1954, were passed by the House of Representatives on August 31. The railway has budgeted for a deficit of Rs.7,921,638, the estimated working expenditure being Rs.79,971,638 against a revenue estimate of Rs.72,050,000. Salaries, wages and allowances of staff account for Rs.44,511,088 of the working expenditure, payments in respect of cost of living allowances alone amounting to Rs.18,000,000.

In addition to the working expenditure, a sum of Rs.25,099,969 (repayable on the annuity system based on the life of the assets) is to be lent by the Government to meet the cost of renewal and capital works during 1953-54.

MOZAMBIQUE

Progress of New Line to Rhodesia

Rapid progress is being made with the construction of the new line which will form part of a through route between Lourenço Marques and Bulawayo. This line is being built as an extension from the present railhead at Guijá, a small village on the south bank of the Limpopo River about 150 km. north-east of Lourenço Marques. It will cross the Limpopo over a large irrigation barrage to be built some 24 km. upstream. Thence, the line will follow the north bank of the river for nearly 300 km. and enter Southern Rhodesia near Pafuri close to the borders of Mozambique, Southern Rhodesia, and the Transvaal. The Rhodesia Railways are building the section in Rhodesian territory from Bannockburn on the Shabani branch to the Mozambique border.

CANADA

C.N.R. Road Services

The reorganisation of all Canadian National Railways road services, except those of the Canadian National Express, in one road transport department has been announced by Mr. Donald Gordon, President of the C.N.R.

The new department will be directed by Mr. F. A. Gaffney as General Manager under the jurisdiction of the Vice-President of Operations. It will be responsible for the administration of road services, including schedules, maintenance, tariffs, and extension of services for both bus and cartage operations.

Budd Railcars for C.P.R.

The Canadian Pacific Railway has ordered four air-conditioned, stainless steel, self-propelled diesel railcars from the Budd Company for operation in Eastern Canada.

The order for the cars, the first to be made by a Canadian railway, followed extensive studies and a successful trial operation of a car between Montreal and Mont Laurier in February. Three of the cars will be of the RDC-1 type and the other car, an RDC-3, will have a 32-ft. head compartment for luggage, parcels, and mail, and will seat 48 passengers. Delivery is expected in November. The C.P.R. plans to use two RDC-1's coupled together between Toronto and Detroit, and the RDC-3 on the North Bay-Mattawa-Angliers service in Northern Ontario. The fourth will be used to provide additional service between Montreal and Mont Laurier.

The RDC cars, powered by two 275 h.p. General Motors diesel engines beneath the floor and driven by torque converters fixed to one axle of either bogie, can attain a top speed of 85 m.p.h. and from standing reach a speed of 44 m.p.h. within 1 min. Budd disc brakes will be fitted.

BRAZIL

Project for Transbrasilian Line

The Inter-state Commission for the Parana-Uruguay Basin has approved the project for a line connecting Porto Vargas, on the borders of Sao Paulo and Mato Grosso, with Porto Velho, capital of the Guapore Territory. The line would link the rubber forests of Amazonas, Guapore, Acre and Mato Grosso to Sao Paulo. It would be nearly 2,000 km. long, pass through Cuiaba, in Mato Grosso, tap fertile

regions now without railways in that State and be linked by branch lines to cities in Goias. The line is planned as an extension of the Estrada de Ferro Araraquara, which runs from Araraquara, through Catanduva, to Votuporanga (334 km.).

An aerial survey of the region between Porto Vargas and Cuiaba, the first section of the line, has been completed and the Sao Paulo and Mato Grosso Governments have signed an agreement permitting the railway to cross their territories. The 1946 Constitution provides explicitly for the transfer of the Federal Capital to the Central Plateau, in Goias, and a Commission has been appointed to mark out the site. The transfer of the capital will give a great impulse to development in the west central parts of the country.

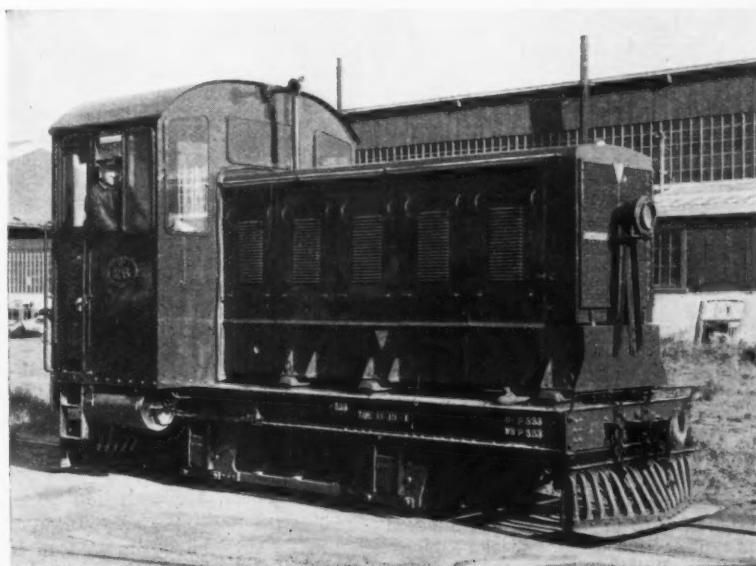
MEXICO

Diesel Traction to be Extended

The National Railways are to extend diesel-electric traction. At present 15 per cent of the motive power is diesel, and it is planned to increase this as much as possible by allocating funds from the railway budget.

Locomotives still to be delivered will be used on freight, particularly in the north. Diesels will also be used to improve passenger service on the Mexico-Nuevo Laredo, Mexico-Ciudad Juarez, Mexico-Guadalajara and Mexico-Vera

New Zealand Locomotive Conversion



A 65-h.p. "Eb" class 0-4-0 diesel-electric locomotive for workshops shunting, rebuilt from an obsolete battery-electric locomotive

Cruz routes. Mexico still does not have repair yards for diesels and since they have been in heavy service it has been necessary to withdraw some units, which have been sent to San Luis Potosi for minor repairs.

When the Valley of Mexico terminus in Mexico City is completed, the railway will be able to undertake the complete overhaul and maintenance of diesel engines.

UNITED STATES

New Station at Mobile

The Louisville & Nashville is beginning work on a new station at Mobile, the port on the Gulf of Mexico 140 miles short of New Orleans on its main line to the south. The building will be of masonry construction, with steel frame and concrete floors; there will be waiting rooms, and luggage and restaurant facilities on the main floor; and railway offices will occupy the second floor. Clearing the site and relocation of the tracks has begun already. The station will cost \$800,000.

A Fifth Santa Fe "Chief"

The Atchison, Topeka & Santa Fe Railway is planning a further addition to its "Chief" series of long distance stream-line trains, the "San Francisco Chief." This is expected to be in operation by next Easter. It will be the first serious attempt by the Santa Fe to compete with the Chicago & North Western-Union Pacific-Southern Pacific and the Chicago, Burlington & Quincy-Denver & Rio Grande Western-Western Pacific groups for the passenger traffic between Chicago and San Francisco.

From Kansas City westwards, the new train will follow the longer of the two Santa Fe main lines, through Topeka to Newton, and from there *via* Wichita, Amarillo, and Clovis; it will also offer direct competition with the Southern Pacific and its Texas & New Orleans subsidiary by including a through section between Houston and Oakland Pier, from which, as with all Santa Fe trains, it will be necessary for passengers to ferry across to San Francisco. Hitherto the only Santa Fe train to follow this route throughout has been the "Grand Canyon," taking 55½ hr. westbound and 54 hr. westbound for the 2,547 miles; but the time planned for the "San Francisco Chief" is 48 hr. Six complete train sets will be required for daily service, and they will be composed of the latest Pullman sleeping cars and reclining chair cars, with lounges and also, probably, dome cars. No extra fare will be charged on the new trains.

Speed Restriction Petition Refused

In 1950 a group of citizens of Glencoe, Illinois, petitioned the Illinois Commerce Commission that a maximum speed restriction of 60 m.p.h. should be imposed on express trains of the Chicago & North Western Railway over certain of the busier level crossings within their town limits. This is the main C. & N.W. line between Chicago and Milwaukee, and

through Glencoe, 19½ miles out of Chicago, the speed of the numerous C. & N.W. diesel-hauled streamline trains of the "400" series is frequently 90 m.p.h. and more. It was contended by the petitioners that there was a danger of persons standing at a crossing as a train passed at such a speed being drawn under it by suction.

Careful experiments made by the Commission have shown that the violent air movements set up by trains at such speeds tend to blow any neighbouring objects away from the tracks, rather than to suck them inwards. It is possible that such a movement might cause an unprepared person to fall down, but even so the fall would probably be away from the track rather than towards it. Moreover, it was proved that 96 per cent of the casualties at these Glencoe crossings in 1947-52 had been with trains travelling at less than 60 m.p.h. The Commission has therefore refused the petition.

ITALY

New Line in Perugia Province

Work was begun in 1925 on a line to serve the lignite mines at Pietrafitta, but has only lately been completed. The line runs from Ellera Corciano Station on the Terontola-Foligno line, serving the villages of Castel del Piano, Castiglione della Valle, Montepetrollo and Pietrafitta, and reaching its terminus at Tavernele Val Nestore, 13½ miles from Ellera Corciano.

SWITZERLAND

New Wagons for Cement Transport

The Federal Railways have introduced a new type of goods wagon for the large-scale transport of cement. The wagons carry two large cement containers and have a gross weight of 40 tonnes (pay load 26½ tonnes). Length over buffers is 8.6 m. and wheelbase 5.25 m. They are designed for axle loads of 20 tonnes and are fitted with a special spring suspension system as well as roller bearings so that they can run at a maximum speed of 100 km.p.h.

Each of the two pressure-proof containers can take 25 cu. m. of cement which can be blown out by compressed air in a few minutes. The wagons are at present used for the transport of up to 400 tonnes a day from the cement works at Wildegg and Siggenthal to Rodi Station on the Gotthard line whence the cement is taken by aerial cableway across the Campolungo Pass to the building site of the Sambuco Dam, part of a scheme to harness the water power of the Maggia Valley.

FRANCE

Coach Modernisation

Since the beginning of the year, the South Eastern and Mediterranean Regions of the S.N.C.F. have put back into service after modernisation two- and three-axle coaches of the former P.L.M. The coaches were third-class

side-corridor compartment stock built between 1905 and 1910 for express services, and second and third-class centre corridor open stock built between 1910 and 1928 for suburban services.

These vehicles had a wooden body bolted on to a metal underframe, and with a door for each compartment. It decided to modernise them to reduce maintenance costs and to enhance their comfort and appearance. The cost of a normal overhaul was not to be greatly exceeded and the tare was not to be increased.

The wooden body was replaced by a light metal framework and the individual compartment doors by one central entrance and platform. Some interior furnishings have been retained and the coaches are still open or side corridor stock. The doors fold outwards and are operated by compressed air.

Some of the modernised coaches are being used as trailers for railcars. The tare of the side corridor coaches has not been altered, and there has been a saving of 15 cwt. in that of the centre-corridor type.

U.S.S.R.

New Locomotive Design

A new 2-8-2 passenger locomotive, built by the Kolomna Locomotive Works, is undergoing trials on the Moscow-Kursk-Donbass line. Several new features have been embodied in the design. The boiler water is preheated to a temperature just below boiling temperature even before reaching the boiler. A steam overheating device is provided which permits the overheating of the steam to 450° C. and has been found to result in reduced coal consumption. Stoking is automatic, and the lubrication system of the drive has been perfected. A very large cab is separated from the tender by a pneumatic door. The locomotive is designed for a maximum speed of 125 km.p.h. After trial runs extending over more than 200,000 km., work on three more locomotives of this type has begun.

BELGIUM

Brussels Junction Line Services

From October 1, when more tracks of the Brussels Junction line are brought into service, there will be an increase from 200 to 340 in the number of trains traversing the line daily. The Paris-Brussels-Amsterdam trains which at present run over the western belt line at Brussels will be re-routed over the new line between Brussels Midi and Nord. Of the half-hourly Antwerp-Malines-Brussels semi-fast electric trains, alternate trains will continue semi-fast to Charleroi, providing a direct Antwerp-Charleroi service every hour; at rush hours the other semi-fasts from Antwerp normally terminating at Brussels Nord will also run through to Charleroi, but non-stop. Stopping trains will run every hour (half-hour in rush hours) between Malines and Braine-l'Alleud.

Developments in Fluorescent Lighting

Improved fluorescent tube giving 12½ per cent light increase at no extra cost

NEW techniques and manufacturing methods of the General Electric Co. Ltd., demonstrated recently at the company's research laboratories at Wembley, will result in fluorescent lighting tubes with greater reliability and efficiency. In particular, the Osram 5-ft. 80-W Daylight and Warm White tubes, as used in railway station lighting and industrial applications, will give an increased light output of 12½ per cent, representing a major contribution to industrial efficiency with no increase whatsoever in cost to the user; with the improved performance of the tubes now being manufactured, maintenance costs will be lower. The research was conducted with the aid of high-voltage X-ray equipment, the electron microscope and electron diffraction apparatus.

The three chief contributions of research to the new improved tubes are the finding of the best formula and correct structure for the fluorescent powder, the best way to deposit the powder and make it adhere permanently to the inner surface of the tube and a design of cathode to produce the best life performance.

Production Techniques

Osram fluorescent tubes are manufactured at Shaw, near Manchester, where the works recently have been re-equipped. The four main contributions made by the works to the improved efficiency of the new tubes are the accurate control of cathode production, fixing and coating, a new vacuum pumping technique, a new automatic stabilising machine, and quality control. The coiled coil wires for the cathodes are produced on highly specialised coiling machines working to limits of a few ten-thousandths of an inch. The cathodes are then fixed to nickel lead-in wires on a new design of multi-head automatic assembly machine, the fastest and most accurate machine of its type. Embodied in this is the process of cathode coating in which an automatic process has been devised by which the temperature of the coating is controlled to within 1° C. in summer or winter, by night or day. A close check on fluidity is maintained and all atmospheric dust eliminated. By exact timing and mechanical precision an amount of coating, correct to within 0.00004 oz. is applied to the coil. This precision manufacture of the cathode and determination of the exact formula and structure of the mixture have eliminated any tendency for the ends of the tube to blacken.

A new design of automatic vacuum pumping machine increases the rate of production of fluorescent tubes and has much improved performance. The Shaw Works have produced an automatic pumping machine which introduces a new development in high-speed

exhausting, "mercury dosing"; globules of mercury are introduced to the tube during pumping at predetermined intervals, which obtains the final vacuum in the shortest time.

The new automatic stabilising machines designed and built by G.E.C. engineers produce correct activation in the cathodes and stabilise the striking, or starting voltage, of the cathodes so that there shall be no variation in the finished product. For this purpose machines are fitted with voltage regulating gear.

Railway Applications

Industry in all its aspects will benefit from the improvements which have resulted from the constant research carried out at the G.E.C. laboratories, not least among them the railways. Fluorescent lighting has been installed in the last few years in various railway premises, such as engine inspection pits, on platforms, inquiry offices, and waiting rooms.

An example of lighting in inspection pits is the G.E.C. installation of two batteries of eight specially designed fittings in pits at the Becton Gas Works of the North Thames Gas Board, on an internal railway system of 100 track miles and a stock of 40 steam locomotives. Two pits were equipped with eight specially designed fittings, arranged to accommodate one Osram 5-ft. 80-W fluorescent lamp. These fittings are arranged in pairs on the opposite walls in the four sections of

the pit where most of the oiling and inspection is carried out. The resultant illumination and quality of light has been a great improvement, and many similar schemes have been designed for home and overseas installation.

In planning the interior lighting of the train arrival bureau at Euston, London Midland Region, adequate lighting for reading and writing had to be installed, without interfering with the legibility of the announcement on the screen and all ceiling fittings are of a recessed pattern with louvres, taking two 5-ft. 80-W. lamps. For showcase lighting the G.E.C. supplied eleven one-lamp flush type louvre fittings for 4-ft. 40-W. lamps, all lamps in the ceiling and showcases being warm white.

Fluorescent lighting fittings also were installed on the platforms of the electrified section of the Liverpool Street to Shenfield section of the Eastern Region, as shown in the accompanying illustration.

The lighting is by means of lanterns, each containing two Osram 5-ft. 80-W. fluorescent lamps, and was specially designed by the G.E.C. to the requirements of the Electrical Engineer, Eastern and North Eastern Regions. The light distribution is such that it provides very even illumination, averaging about one lumen per sq. ft. over the whole platform area.

The satisfactory performance of these and similar applications will be increased by use of improved tubes now under manufacture.



Fluorescent lighting at Seven Kings, Eastern Region. Each lantern contains two 5-ft. 80-W. lamps

Fire Prevention in Diesel Railcars

*Trials with automatic protection device
against fires in the engine area*

TESTS were conducted recently on the Ulster Transport Authority and Great Northern Railway (Ireland) lines with fire protection equipment manufactured by the Graviner Manufacturing Co. Ltd.; this has a temperature-sensitive element comprised of an alloy-steel barrel of high expansion coefficient containing a spring-bow assembly of low coefficient of expansion on which are mounted two electric contacts connected to a terminal block by fire-resisting cable. A rise in temperature above that for which the device is set causes the barrel to expand and so remove the compressive force from the bow assembly, permitting the contacts to close. When the temperature drops the barrel contracts, compressing the bow assembly and re-opening the contacts. The fireproof cable from the detector can form part of either a visible or audible alarm system, and could even be arranged, in addition, to energise a pilot circuit which could shut off engine power.

One set of tests was carried out by the U.T.A. on two cars of one of the multi-car Leyland engine train sets working on the Belfast-Bangor line of the former B.C.D.R., and the other was undertaken near Dundalk by the G.N.R.(I.) with a twin car A.E.C. set.

U.T.A. Tests

In the test on one of the two engines in the U.T.A. car a spray ring following the approximate outline of the engine was fitted, and the rings were rigidly attached to the car floor. The spray pattern was designed to cover the whole power-transmission unit, with heavier concentration at the fuel injection pump and torque converter. Detection was provided by 20 ft. of pyrotechnic cord-type detector, suitably led above the power plant, with the switch mounted at the respective car side and accessible from ground level through a special protecting cover. The switch thus provided means for circuit testing and emergency operation. A 12-lb. dual-head extinguisher was mounted on a bracket attached to the underframe and about 10 ft. from the power-plant area. Piping was led from each head to the spraying.

An audible warning device was mounted in the driving cab, and toughened glass panels were let into the floor above the engine for observation purposes. A continuous sparking device was mounted for ignition purposes.

Each fire-detector switch was wired direct to the related head of the extinguisher, and in parallel with a lock-in type of relay, so that with operation of either detector the extinguisher would discharge through its respective port, and at the same time the relay would trigger, closing the circuits of the

audible warning and the engine cut out solenoid. The latter circuit was so arranged that the engine could not be restarted until the car was returned to the maintenance shop for resetting of solenoids.

For the stationary test a considerable quantity of petrol-soaked rag was distributed along the top of the power plant, with emphasis above the torque converter. A train of rag and petrol was laid along the top to the far end of the engine, the igniter being placed above the torque converter. Doors were closed and floorboards replaced. The engine was started and was running at medium speed when ignition occurred. Almost immediately widespread flames were observed, and within two seconds, viewed from inside, they appeared to cover the whole top engine area, burning with great intensity. The detector was heard to operate, and in less than one second no flame was visible. The engine cut-out functioned and the engine stopped. No appreciable quantity of smoke or fume entered the car during or immediately following the fire. Doors were opened and floorboards raised, revealing only charred rag. Apart from the end of a short length of string suspended across a frame member, no smouldering or other charring was evident.

Trial at Speed

For a running test a fast run was made to Bangor, during which it was possible to check that even at speeds approaching maximum, the airflow over the engine was not high. At time of observation the torque converter was leading. On the return trip, after a few miles the train was halted, and a fire similar to that of the previous day, was laid. On attaining about 45 m.p.h. the igniter was operated, but owing to a short circuit no fire resulted. The train was again halted, the igniter tested, and petrol supply replenished, followed by another attempt when speed had once more reached about 40 m.p.h., but without success.

After another halt during which the igniter was tested, and the rags re-soaked with petrol, an attempt was made when the speed reached 35 m.p.h. This time fire was ignited and a tremendous amount of flame was observed to be swirling above the engine. Again no reliable functioning times were observed, but it was noted that almost immediately following detector operation, the audible warning functioned, the engine cut out, and the flames disappeared. No appreciable quantity of fumes or smoke were seen to enter the car. The train was brought to an emergency halt, and when the floorboards were lifted, there were no traces of fire,

smouldering or charring, and there was no obvious damage to any part of the engine or underframe. When the solenoids were reset, the engine started immediately.

Results on G.N.R.(I.)

For the tests on the G.N.R.(I.) twin-car A.E.C. set the normal engine side panel was replaced by an open-mesh grill to assist dissipation of fumes and to give additional engine cooling. Static tests with smoke generators were made first to test car floor sealing. The spray pattern here, with a diesel-mechanical car, covered the engine transmission plant combination with emphasis on the fuel injection lines and the flywheel area. A warning light was mounted in the driving cab and four mica observation panels were put into the car floor. The G.N.R.(I.) chemist carried out methyl bromide concentration tests.

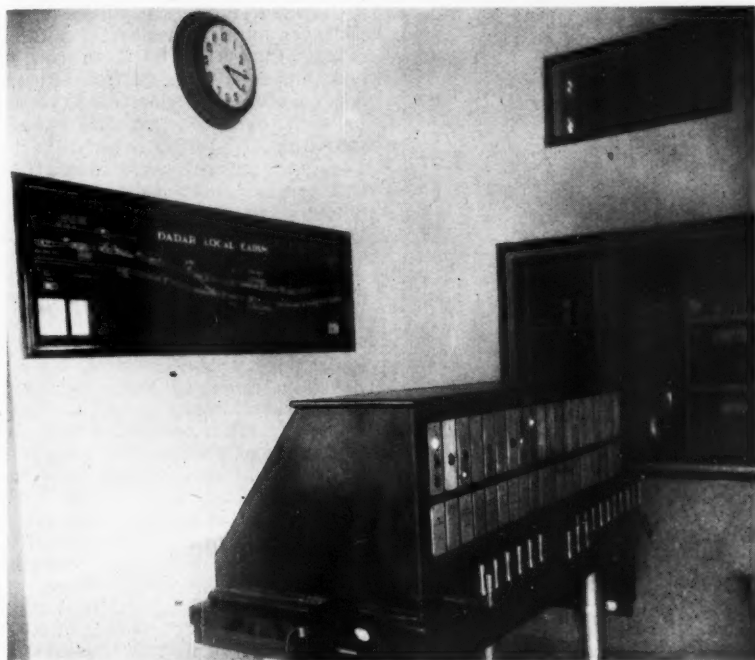
The arrangement was that the fire detector switch should be wired in parallel with the extinguisher and the driver's warning light. On receiving the warning the driver was to cut out his engines and bring the car to a stand as quickly as possible. As an emergency measure a push-button switch was paralleled into the bottle circuit and the two emergency bottles were wired in parallel to a second push button.

After running for five miles the car was halted, and cotton waste wads were placed along the top of the fuel injection pipes and above the flywheel casing and liberally soaked in petrol. The car was restarted, and on attaining about 50 m.p.h. the igniters were started. Within one or two seconds widespread flame was observed, burning fiercely towards the generator end of the engine. Four or five sec. after the first flames were observed the detector functioned and the bottle was heard to discharge. Immediately the flame was lost to view and shortly afterwards a volume of bluish vapour was seen, apparently discharged from the exhaust. Two small jets of methyl bromide were discharging into the car through the bleed holes in the junction boxes of the emergency bottles. This was because the three bottles were linked to the same gallery pipe without non-return valves. Though it had no effect on the general functioning of the system it was unfortunate, as a concentration test was carried out within 6 ft. of the discharge point. The engine compartment was virtually free of fumes before the open-mesh grill was removed when the car came to rest 20 sec. after the warning. There were no smouldering fragments, though most of the waste was still petrol-soaked. The engine restarted immediately.

Signal Wiring Practice in India

Installation of power and colour-light signalling on the former Bombay, Baroda & Central India Railway

By H. C. Towers, Chief Signal & Telecommunications Engineer, Western Railway



Interior of operating portion of Dadar local emergency signalbox

ON most railways, the signal and telecommunication department is responsible for power, electro-mechanical, block, telephone, telegraph, teleprinters, and ancillary circuits. In the early days of power and electro-mechanical signalling some signal departments were not responsible for the telecommunication side of the work. So far as electrical circuits were concerned, their obligation extended to the wiring of the early power and electro-mechanical installations.

At that time, relay rooms were practically non-existent. Signalling relays that could be accommodated in signal cabins were placed in wooden cabinets. Sometimes the upper portion of the door was glazed. Where possible, the fuses were located at the bottom of the cabinet and were not easily accessible for testing or reading labels. The wiring was concealed and disappeared through holes in the wood mounting into wooden trunking. The condition of the wire remained invisible and the state of its insulation could not easily be checked.

Early Installations

On the former B.B.C.I.R., work on the installation of power and colour-light signalling was commenced in 1927-28. Electric trains had started to run from the Bombay terminus at Colaba to Borivli on January 5, 1928.

At that time, this section was worked by Sykes lock and block, and the first step was to remove the battery track circuits used for the release arrangements and provide a.c. track circuits with impedance bonds. This work had to be completed before the electric services commenced. Continuous track circuits were then provided from Churchgate to Grant Road on which section there are two intermediate stations, Marine Lines and Charni Road.

Three-aspect colour light signals were installed with a home and a starting in each direction. It was considered necessary to educate the transportation staff in the new system of working by means of continuous track circuits, and small slide control frames controlling these signals were placed in the stationmaster's office. An illuminated diagram was hung over the frame. Relays and fuses were housed in a wooden cabinet with a glazed front. These installations remained in operation until the end of 1930 and were then removed, the signals being converted to full automatic.

At other stations, the yards were track circuited, the existing mechanical signalling being retained. Electric locks were fixed on the levers controlling running signals and illuminated diagrams installed. In these cases also the relays and fuses were placed in wooden cabi-

nets in the basement of the cabins, and the wiring was run in trunking. The first relay room to be used was at the new terminal station at Bombay Central, opened in December, 1930.

The cabin building is of ferro-concrete with Crittall windows and contains a 119-lever electro-pneumatic power frame with the relay room directly under. The relays are not accommodated in cabinets but placed on open wooden shelves. The fuses are arranged on vertical boards at each end of the cabin.

In 1935 two power cabins, at Mahim and Bandra, were brought into use. Mahim operates the junction with the former G.I.P.R. Harbour Branch and contains a 50-lever all-electric Westinghouse frame style K. Bandra has a 101-lever frame of the same type. Both cabin buildings are of concrete and of the same pattern. The relays are placed on open racks composed of angle-iron uprights and wooden shelves. The cable entry is at the back of the cabin and terminates immediately at the fuse board.

The fuse bases are screwed to wooden battens arranged in vee formation so that the cable cores terminate inside the inverted portion while the inside wiring takes off the inside of the vee and runs vertically to the main run above. Wires from this run at intervals to the relay racks in open wooden troughs, with the base composed of round wooden slats. Wiring along the relay shelves is on aluminium hooks.

Track Circuits

With the completion of these two cabins a beginning was made on the installation of continuous track circuits from Bombay Central (North) to Bandra on all four tracks. This permitted certain mechanical cabins, which had been retained for block working to be removed, and automatic signals introduced. At other locations, where points had to be worked occasionally, king lever working was introduced. The original glass fronted relay cabinets could not accommodate the additional relays and relay rooms were constructed adjoining the cabin building. Here again, relay racks and open wiring were used.

With track circuits on all four lines, a considerable number of relays are concentrated at the track relay end and if the usual methods of using a separate box for each relay had been used, there would have been quite a number. These boxes have to be opened during the torrential rains of the monsoon season and as these rains are often accompanied by high winds, the relays quickly get wet. The difficulty



Portion of relay room at Bombay Central

of testing under such conditions can be appreciated.

Instead of boxes, brick cubicles were built on a plinth wide enough at the front for the signal maintainer to stand on it. Corrugated asbestos sheeting is used for the roof with a generous overhang to shelter men from rain and sun. Double doors of teak with asbestos panels enable the whole installation to be available for inspection. The relays are placed on racks of the same construction as in relay rooms with the fuses on a vertical board at the end.

Installation at Dadar

At an installation opened at Dadar a short time ago, special efforts were made to achieve the highest degree of neatness. This is an emergency interlocking, normally switched out, for operating a new crossover between the down and up local lines. Two- and three-aspect colour light running signals are in use, and subsidiary signals are installed for shunting. These signals have been adopted as a future standard for the suburban area and some have already been installed at Churchgate and Andheri. The crossover is worked by electric point machines.

The signalbox is small but every effort has been made to attain a high finish. It is a single storied structure of brick nogging faced with rough-cast cement finish. The operating portion of the box is on the same level as the relay room but divided by a wall. The floor of both rooms is attractively tiled and with a tiled dado around the walls.

A small power frame, of the slide type, mounted on cast-iron pillars, occupies the central portion of the operating room. The slides control running signals, crossover and subsidiary signals. There is a King lever or slide for automatic working. The

aspects of all signals are repeated by coloured visuals set into the description plates at the back of the slide handles.

Track Diagram

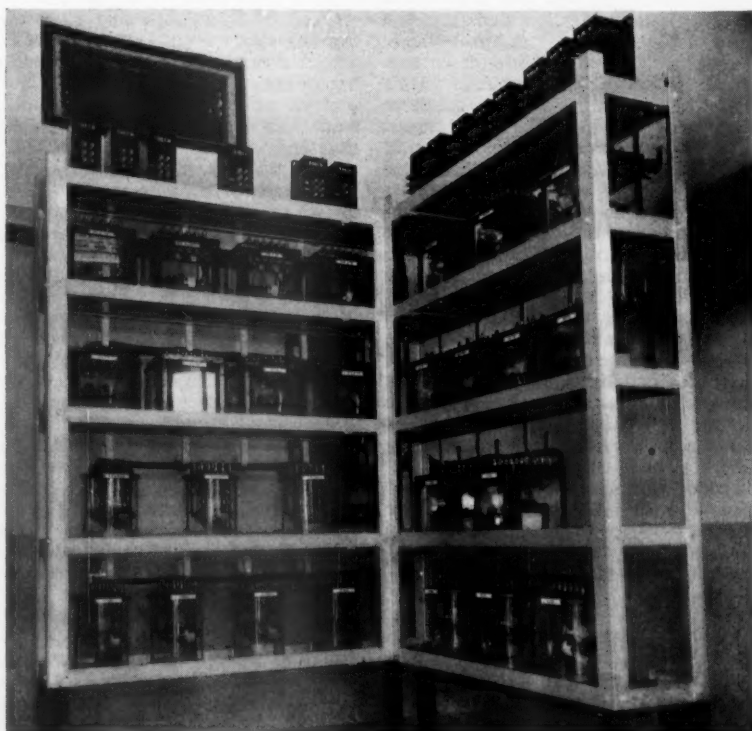
The illuminated diagram is set into the partition wall dividing the operating and relay portion so that only the front can be seen. The back por-

tion protrudes into the relay room. An electric clock is let into the wall over the diagram. A feature of the operation portion is that the only wire that can be seen is the flexible cord for the hand micro-telephone.

All other wiring is concealed, the wires going to the back of the diagram are in the relay room and those for the slide control run inside the cast-iron pillars. Every effort has been made to make the relay room perfect. All relays are accurately centered with respect to each other on the shelves, and the wiring to them is perfectly straight. The same remarks apply to the fuse and terminal board and to the cables taking off from it. Western Railway standard signal department armoured cables are used having wires of 0.064 in. composition of 12 core, seven core, and five cores. The relay room is illuminated by fluorescent tubes. All the work was undertaken by the Western Railway signal staff.

A new cabin at Dadar North is approaching completion and the same degree of finish is being observed. The cabin contains a mechanical frame with the lever handles clad with white Celustoid tubing. The frame will operate two-aspect and three-aspect colour-light signals and subsidiaries, point operation being by all-electric machines.

Since no mechanical gear is attached to the levers except circuit controllers and lever locks, the relay shelves and fuse board are located in the basement which has a tiled floor and dado.



Relay rack in relay room of Dadar local signalbox

New "Red Arrow" Railcars in Switzerland

Two-car electric sets used mainly for special party excursion traffic

TWO two-car "Red Arrow" railcar sets have been delivered in recent months to the Swiss Federal Railways. They have been built by the Swiss Wagon & Lift Works Limited, Schlieren, in collaboration with the Brown-Boveri and Sécheron electrical undertakings.

The vehicles, to which we referred briefly in our August 7 issue, are of integral steel construction, and the interiors are insulated all over against heat and noise by means of sprayed asbestos. An additional sound-insulating layer is applied over the bogies. Particular emphasis has been laid in the design on the efficient aerodynamic form of the vehicles.

Each unit of the two-car set rides on one carrying and one motor bogie. The carrying bogies are of the latest Schlieren design, and the S.L.M. motor bogies are in general similar to those of the new Swiss Federal Railways "CF2 4/4" railcars. Both motor bogies are adjacent, in the middle of the twin unit, and each has two traction motors. The carrying bogies are at the outer ends of the two-car units.

Since the two-car set normally runs as an individual unit, normal coupling arrangements are unnecessary, but sprung drawhooks have been provided. The two single units are coupled together, and there is a bellows connection between them for the convenience of passengers moving from one to the other. There are 123 passenger seats.

Braking

Oerlikon automatic two-step air-brake equipment is fitted for use at high speeds. In addition rheostatic braking can be applied by a simple movement of the controller handle.

Each carrying bogie is also fitted with a hand brake.

Sliding doors under electro-pneumatic control from the driving cabs are fitted. Doors can also be opened individually if necessary by means of a handle adjacent to each.

Formica panelling is used as an interior wall-covering. The floor covering is Plastoflor in the passenger compartments, and rubber, with sponge-rubber underlay, in the staff sections.

Wide windows and glass inserts in the partitions ensure an uninterrupted view. All windows are of safety glass. In the central compartments movable steel chairs are provided which can be placed where travellers wish. Rotatable seats, each for two persons, are fitted in the end compartments. Reclining backs, as in modern airliner practice, are a feature of the design. Two more similar seats for passengers are located alongside each driving compartment.

Commodious luggage racks are arranged above the windows. A small bar compartment with refrigerator, sink, and electric cooker is situated in the passenger portion of one unit.

Broadcasting System

Twelve loudspeakers are distributed between the two units, and can be operated either from the driving cabs or from the sound equipment compartment. They are used for broadcasting music or information.

A continuous fitting in the centre of the ceiling houses the fluorescent tubes for lighting, which operate on 250 V. Enclosed lighting fittings mounted on the side walls between the windows provide supplementary illumination if desired, and are connected to a 36-V circuit.

The heating and ventilating system



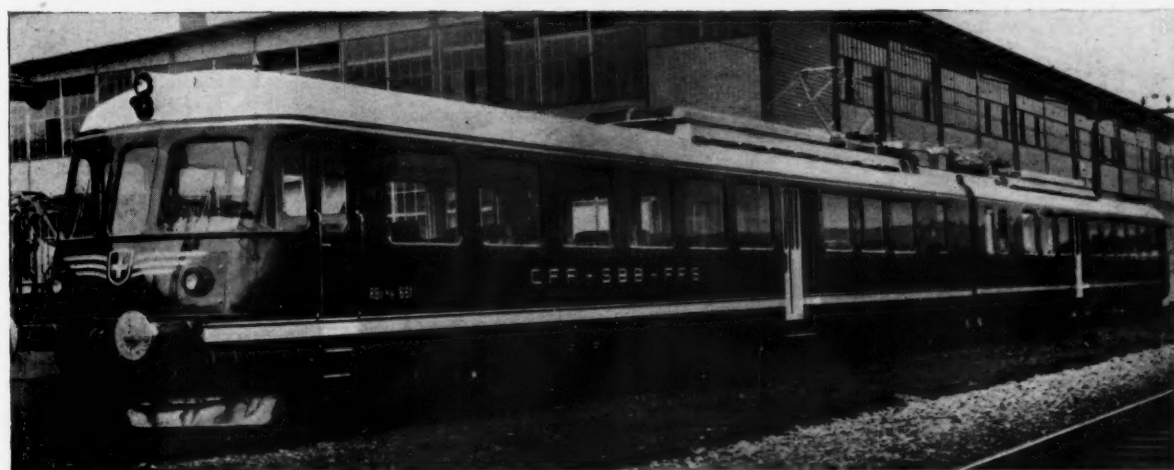
Central compartment, showing bar and movable steel chairs

is of a new type developed by Schlieren in conjunction with specialist firms and installed for the first time in these railcars. Fresh air from outside is supplied by fans through ducts to the inlet openings above the windows which are provided throughout the length of the vehicle. In winter the air can be pre-heated. Thermostats regulate the air temperature and the speed of the fans according to the outside conditions.

In intense cold the heating can be supplemented by radiators under the windows, which are also under thermostatic control. Used air is exhausted through apertures in the roof.

The high-tension electrical equipment

(Continued on page 326)



Two-car "Red Arrow" railcar set, Swiss Federal Railways. The transformers supplying the traction motor voltage are in the roof under the raised portion

British Railways Standard Class "2" Tank Engine

Designed to replace various classes of tank engines now becoming obsolete

THE first of a new class of mixed-traffic tank engine, numbered 84000, has been completed at Crewe Works. This order consists of 20 engines, and they are to work in the London Midland Region of British Railways on branch line passenger work of the type worked up to now by old 2-4-2 and 0-4-4T engines of pre-grouping design.

The locomotive has been designed under the direction of Mr. R. A. Riddles, Member for Mechanical & Electrical Engineering, Railway Executive.

Though the smallest tank engine to be built in British Railways standard range of twelve types, it incorporates as far as practicable all the modern developments in design which have

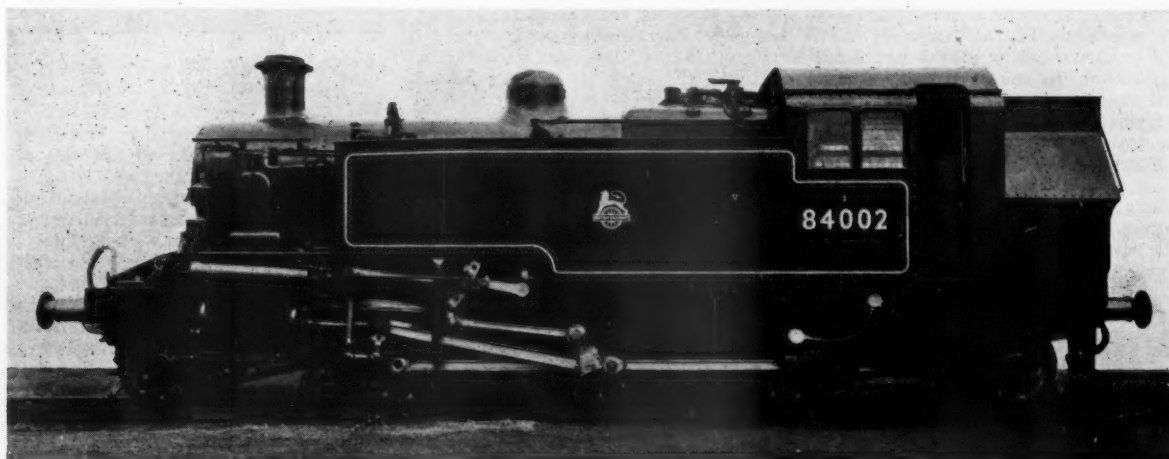
proved themselves on larger types. A rocking grate with self-emptying ashpan has been fitted; the smokebox is self-cleaning. The leading dimensions of the tank engines are as follow:—

Cylinders, dia. and stroke	...	16½ in. × 24 in.
Wheels:		
Coupled dia.	...	5 ft.
Carrying dia.	...	3 ft.
Wheelbase:		
Coupled	...	13 ft. 9 in.
Engine total	...	30 ft. 3 in.
Heating surfaces:		
Tubes	...	924 sq. ft.
Firebox	...	101 sq. ft.
Total evaporative	...	1,025 sq. ft.
Superheater	...	134 sq. ft.
Grate area	...	17.5 sq. ft.
Boiler pressure	...	200 lb./sq. in.
Tractive effort	...	18,513 lb.
Adhesion factor	...	4.7
Weight in working order	...	63 tons 5 cwt.

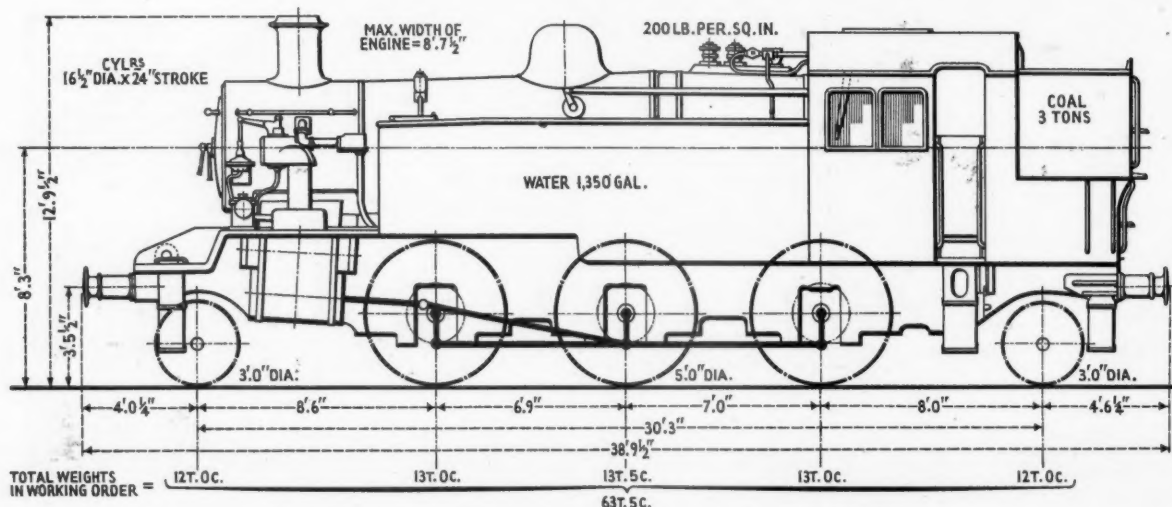
The boiler is interchangeable with

that used on the standard class "2" 2-6-0 tender engine, and is generally similar to that used on the class "2" 2-6-0 and 2-6-2 engines of ex-L.M.S.R. design. The barrel consists of two rings of carbon steel plate, the second being tapered. The outside diameter increases from 4 ft. 3 in. at the front ring to 4 ft. 8 in. at the firebox end.

The front ring is ½ in. thick, and the back ring ¾ in. thick, and a drum-head type smokebox tubeplate is fitted. The barrel contains 12 flue tubes, 5½ in. dia. outside and 7 s.w.g. thick, and 162 small tubes 1½ in. dia. outside and 12 s.w.g. thick. The length between tubeplates is 10 ft. 10½ in. The Belpaire firebox is 5 ft. 11 in. long and 4 ft. 0⅞ in. wide outside, giving a grate area of 17.5 sq. ft. The steel



British Railways class "2" standard tank engine for branch-line passenger services



Principal weights and dimensions of the class "2" tank locomotive

outer wrapper is $\frac{1}{2}$ in. thick, and the copper inner firebox wrapper is $\frac{1}{8}$ in. thick. The throat and backplate, $\frac{1}{4}$ in. and $\frac{1}{2}$ in. thick respectively, are vertical. All water space stays are of Monel metal, with nuts on the inside of the firebox; other stays are of steel.

Boiler mountings as far as possible conform with other British Railways standard types, as do their location and the cab controls. Fibreglass mattresses are used for boiler and firebox insulation.

Engine Particulars

The main frame plates are 1 in. thick and are suitably stayed with fabricated stays. Hornblocks are provided for the driving axle with guides at the leading and trailing coupled axles. They are fitted with manganese steel liners welded and riveted to mild-steel backplates bolted to the guides, and permit of subsequent adjustment.

The coupled axleboxes are of cast steel with pressed-in horse-shoe brasses.

Mechanical lubrication is fed direct to the axlebox keeps in which a worsted pad feeds the oil to the journals. Spring gear and adjustment conforms to standard design. The outside cylinders are 16 $\frac{1}{2}$ in. dia. by 24 in. stroke, with 8 in. dia. piston valves operated by Walschaerts valve gear, giving a travel of 6 in. in full gear, with 1 $\frac{1}{2}$ in. and $\frac{1}{4}$ in. lap and lead respectively.

Features somewhat similar to the standard class "3" tank engine include crossheads, coupling and connecting rods. Skefko self-aligning roller bearings are also fitted to the return cranks. The pony truck is also similar in construction, including the method of transmitting the load to the axleboxes, and sideplay control retarding gear. The trailing truck is also of the swing-link type as fitted to the class "3" trailing truck.

The side tanks are of riveted and welded construction and hold approximately 1,350 gallons of water, and an external sieve box and water feed valves

are fitted on the right-hand side for the feed to the injectors. Cab layout and fittings conform to other standard engines, and the bunker holds three tons of coal.

Steam and vacuum brake equipment is identical with other British Railways standard engines. To enable the class "2" tank engines to work push-and-pull trains, vacuum-controlled auxiliary regulator valves are fitted in each steam pipe. These are single-seated poppet valves and are mechanically operated by linkage from a diaphragm-type vacuum cylinder. The following are the principal suppliers of equipment for these locomotives:—

Vacuum brake equipment ...	Gresham & Craven Limited
Self-aligning ball bearings for return cranks ...	Skefko Ball Bearing Co. Ltd.
Buffers ...	Geo. Turton, Platts & Co. Ltd.
Fibreglass boiler insulation ...	W. Gilmour Smith & Co. Ltd.
Mechanical lubricators for cylinders and axleboxes ...	C. C. Wakefield & Co. Ltd.
Superheater elements ...	Superheater Co. Ltd.
Manually-operated blow-down valve ...	Everlasting Valve Co. Ltd.

Extension in Western Uganda Opened

First 45 miles completed from Kampala



Inaugural train on the new line

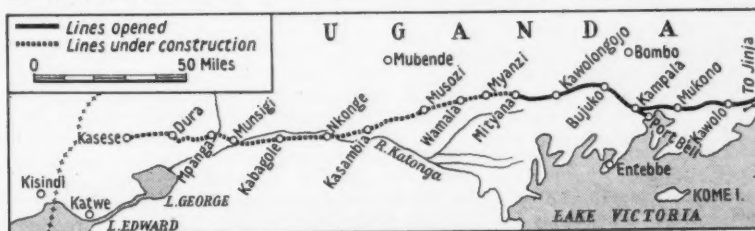
THE first section, 45 miles long, from Kampala to Mityana, of the 209-mile extension which the East African Railways & Harbours are building in Western Uganda was opened for traffic on August 1. There are two intermediate stations, Bujoko and Kawolongoyo, which are 18 and 32 miles respectively from Kampala. The line, when completed, will extend from Kampala to Kasese which lies in the foothills of the Ruwenzori Mountains, near the Uganda-Belgian Congo border.

From Kampala the line follows the Mayanja Kato swamp valley for 30 miles, then turns into hilly country leading to Mityana township. For 20

miles of the route, the railway penetrates dense indigenous forest. Numerous lateral swampy valleys have had to be crossed, and the construc-

tion of earth embankments by machinery over these swamps presented a problem when construction of the line began early in 1952. The clearing of the formation through the forests was another problem, as some of the older indigenous trees were of massive girth, a number being 15 ft. and more, and the united efforts of three heavy tractors were needed to bring down the larger specimens.

About half the work of construction was carried out departmentally by the East African Railways & Harbours. The first 23 miles of earthworks, let out to contract, were not completed until early in March last. Platelaying was deferred until then, and in an endeavour to make up for lost time a section of about seven miles of track was laid beyond the contractor's section. The rails, sleepers and fittings were despatched around railhead by road transport, and platelaying continued forward until at last the gap at mile 23 could be closed. During this phase, details for the construction of



Western Uganda Extension, showing section completed between Kampala and Mityana, and that beyond under construction

the 164 miles from Mityana to Kasese was finalised, tenders invited and contracts let.

Beyond Mityana labour gangs of 2,000 men are distributed as far as Kasese. Two large contracts are in full operation along the Katonga River Valley and on the Lake George escarpment. The departmental earthworks plant units, now increased to three, are deployed immediately beyond Mityana, completing the formation in readiness for platelaying beyond railhead.



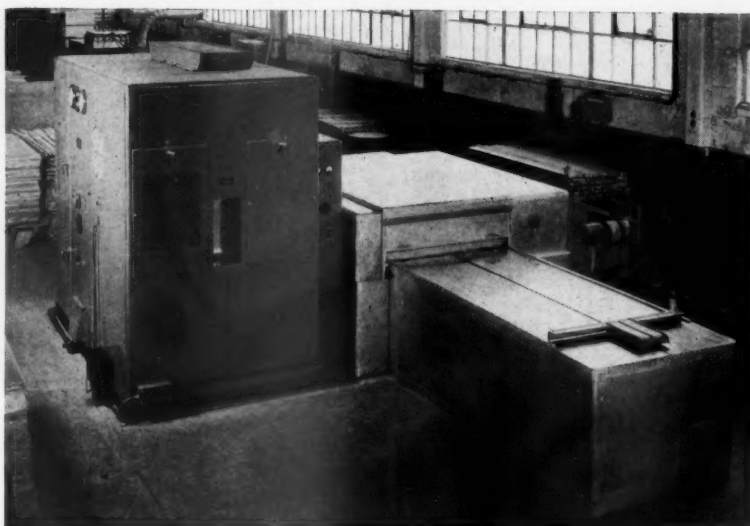
Earth moving machine in cutting

Radio-Frequency Edge Glueing Machine

Three times output of previous models

A 5-kW. radio-frequency glue-setting machine, developed jointly by the General Electric Co. Ltd. and Fielding & Platt Limited, was described in our March 14, 1952 issue. The range of these machines has recently been enlarged to include a 25-kW. model, which it is claimed speeds the operation to give at least three times the previous output. This latest-model, like the 5-kW. machine, is a complete unit, and is similarly operated.

The equipment comprises a pneumatically operated press with feed table and automatic loader to which the radio-frequency power is applied through a suitable load-matching unit from a G.E.C. 25 kW. R.F. generator, together with a glue spreader. Production rates of 6,000 sq. in. of glue line, set hard in three minutes, can be achieved, depending on the nature of the wood and precise type of synthetic glue used, corresponding to the manufacture of a board 80 in. x 40 in. x 2 in. made up from wood strips 1 in. wide, glued in approximately three minutes.



A 25-kW. radio-frequency glue-setting machine developed by the General Electric Co. Ltd. and Fielding & Platt Limited to extend the existing range of units and cater for board up to 2 in. thick

New "Red Arrow" Railcars in Switzerland

(Concluded from page 323)

is concentrated in the middle of the two-car set and laid out to permit of the shortest possible connections. The two transformers which supply the traction motor voltage are mounted in the roof over the bar and lavatory compartments, so that all parts of the equipment sub-

ject to high-tension are above roof level. The control apparatus is housed in equipment cases adjacent to the transformers and above the motor bogies. These arrangements enabled the electrical equipment to be kept completely separate from the passenger accommodation, so that practically no sound can be heard from the traction installation while running. The control scheme provides 17 running and 14 braking notches.

The two-car set measures 153 ft. 10 in. overall and weighs 87 tons empty. The four traction motors, driving through Brown-Boveri flexible disc transmissions, give it a total one-hour rating of 1,400 h.p. Maximum speed is 77½ m.p.h., and the unit will negotiate a maximum gradient unaided of 1 in 26.3, so that it can operate over practically all lines of the Swiss Federal Railways and of the standard-gauge private companies.

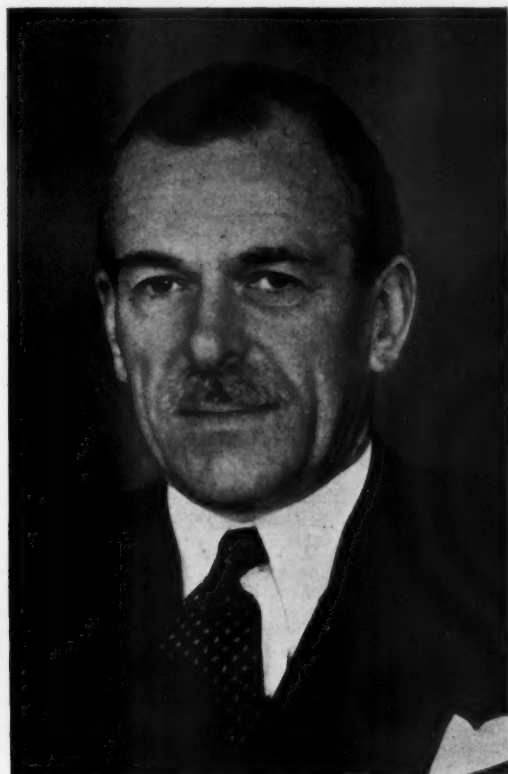
RAILWAY NEWS SECTION

PERSONAL

Mr. R. A. Riddles, C.B.E., M.I.Mech.E., M.I.Loco.E., Member for Mechanical & Electrical Engineering of the Railway Executive, who, as recorded in our September 11 issue, is retiring from the railway service on September 30, joined the L.N.W.R. as a premium apprentice at Crewe Locomotive Works in 1909. After serving with the Royal Engineers from

had been completed and tested before Mr. Riddles left the Ministry at the request of the L.M.S. in August, 1943. Mr. Riddles was prominently concerned with the design and production of large numbers of standard British-built locomotives provided during the war, primarily for service overseas; over 1,000 of the "austerity" 2-8-0 and 2-10-0 types were built. In 1941 he was appointed Deputy Director-General, Royal Engineer Equipment, and

He was for three years in charge of the inspection of locomotives under construction for the London, Midland & Scottish Railway by locomotive-building firms, and, in 1928, he was appointed Assistant Works Manager at the Vulcan Foundry Locomotive Works. During that time he was sent to India to supervise the erection of the mechanical parts of electric locomotives for the Great Indian Peninsula Railway mainline electrification. In 1931



Mr. R. A. Riddles

Member,
Railway Executive, 1947-53



Mr. R. C. Bond

President Elect,
Institute of Locomotive Engineers

1914 to 1919, he held technical appointments with the L.N.W.R. and L.M.S. at Crewe and Derby, before being appointed Locomotive Assistant to the Chief Mechanical Engineer (1933), Principal Assistant to the Chief Mechanical Engineer (1935), Mechanical & Electrical Engineer (Scotland) (1937), Chief Stores Superintendent (1943), and a Vice-President of the L.M.S. (1946). Mr. Riddles' services were lent during the 1939-45 war to the Ministry of Supply to create a directorate for the provision of transport equipment; he also assumed responsibility for all Royal Engineer equipment. The experimental bridging establishment at Christchurch came under this directorate, which designed and produced the Bailey Bridge. Other products of the directorate were the Everall Bridge for railway purposes, internal-combustion engines other than aircraft, road vehicle and submarine; cranes; pipe-lines; and road-making machinery. Piers and pierheads for the "Mulberry Harbour" were supplied—the prototypes

in that year undertook a special mission to America to ensure that essential stores were supplied to Russia and Persia. Since his appointment as a Member of the Railway Executive on its formation in 1947 he has been mainly responsible, among other matters, for the standardisation plans for locomotive types and new carriage stock on British Railways. Mr. Riddles was President of the Junior Institution of Engineers for the year 1947-48, and of the Institution of Locomotive Engineers for 1950-51.

Mr. R. C. Bond, M.I.C.E., M.I.Mech.E., M.I.Loco.E., who will be inducted into the Chair at the General Meeting of the Institution of Locomotive Engineers next Wednesday, September 23, as President for the 1953-54 Session, is Chief Officer (Locomotive Construction & Maintenance) to the Railway Executive. Mr. Bond was educated at Tonbridge, and served his apprenticeship and pupilage at Derby Locomotive Works from 1920 to 1925.

he returned to the L.M.S. service as Assistant Works Superintendent, Horwich, and, in 1933, he became Assistant Works Superintendent, Crewe Locomotive Works. In 1937 he was made Superintending Engineer of the joint L.M.S. and L.N.E.R. Locomotive Testing Station, and, on the outbreak of war in 1939, he was appointed Acting Mechanical & Electrical Engineer, L.M.S., Scotland. Mr. Bond became Works Superintendent, Crewe, in May, 1941; Mechanical Engineer (Locomotive Works) in February, 1946; and Deputy Chief Mechanical Engineer in November, 1946. He was appointed Chief Officer (Locomotive Construction & Maintenance) to the Railway Executive in January, 1948. Later that year, he was elected Vice-President of the Institute of Locomotive Engineers.

The Minister of Transport has appointed Alderman J. Percy Bennetts, J.P., to be a member of the Transport Users Consultative Committee for the London Area,



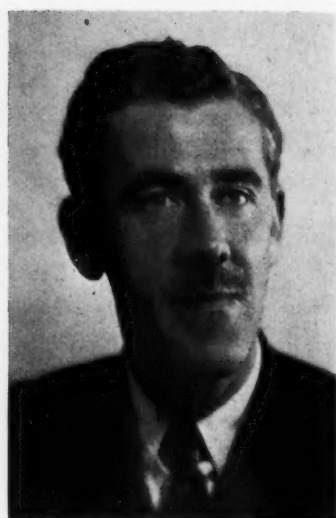
Mr. L. G. Morris

Appointed District Motive Power Superintendent, Neath, Western Region



Mr. A. I. Macmillan

Appointed Assistant (Works Maintenance) Civil Engineer's Office, L.M. Region



Mr. G. C. Parslew

Appointed District Motive Power Superintendent, Cambridge, Eastern Region

Mr. L. G. Morris, M.I.Mech.E., District Motive Power Superintendent, Eastern Region, British Railways, who, as recorded in our September 11 issue, has been appointed District Motive Power Superintendent, Neath, Western Region, entered the service of the former Great Western Railway at Swindon as a Premium Apprentice in March, 1915. Two years later he was commissioned in the R.N.A.S., R.F.C., and R.A.F., serving on the Western Front. He returned from the Forces at the beginning of 1920, as a pupil to the late Mr. G. J. Churchyard, and following Drawing Office experience was in 1924 appointed Locomotive Carriage & Wagon Inspector at Old Oak Common. In June, 1927, Mr. Morris was appointed Assistant to the Divisional Locomotive Superintendent at Newton Abbot, returning to the London Division in a similar capacity in 1939. His appointment as

Divisional Superintendent at Worcester followed in April, 1946. Mr. Morris was transferred to the Eastern Region as District Motive Power Superintendent, Colwick, in August, 1950, which post he has now relinquished upon his return to the Western Region. Keenly interested in the St. John Ambulance Association, he was awarded a Medallion in 1937.

Mr. A. I. Macmillan, District Engineer, Crewe, British Railways, London Midland Region, who has been appointed Assistant (Works Maintenance) Civil Engineer's office, Euston, was educated at Morrison's Academy, Crieff, Perthshire, and joined the Caledonian Railway in 1914 as an Apprentice Civil Engineer. He served with the Royal Artillery in France from 1916-19 and returned to complete his apprenticeship. Mr. Macmillan was Assistant Resident Engineer on the construction of Gleneagles

station, hotel and golf courses and after the amalgamation acted as Resident Engineer on numerous works including sea walls, docks, harbours and bridges. In 1933 he became New Works Assistant to the Divisional Engineer, Scotland, and was appointed District Engineer, Irvine in 1945. He transferred to Crewe as District Engineer in 1947, the post he now leaves for his present appointment.

Mr. G. C. Parslew, District Motive Power Superintendent, Kentish Town, London Midland Region, British Railways, who, as recorded in our September 11 issue, has been appointed District Motive Power Superintendent, Cambridge, Eastern Region, with effect from August 31, 1953, entered railway service as a premium apprentice at Horwich works in 1930. In 1933 he was transferred to the Motive Power Department as an Improver, in which capacity he was



Mr. H. Eagers

Appointed District Engineer, Perth, Scottish Region, British Railways



Mr. R. M. Davies

Appointed District Mechanical Engineer, East African Railways & Harbours



Mr. G. Groome

Appointed Purchasing Agent, London, Canadian Pacific Railway

stationed at Kentish Town and Euston. In 1935 Mr. Parslew was transferred to the Operating Department at Chaddesden Control Office, followed by a period in Derby Divisional Office, and in 1936 he was appointed a Controller in the Derby Office. In 1937 he became Head Office draughtsman at Euston, followed by appointments as Running Shed Foreman, Peterborough and Kirkby-in-Ashfield, 1939-41, Assistant District Locomotive Superintendent, Nottingham, 1941, and a similar position at Carlisle (Kingmoor) in 1942. Later positions were acting Assistant (Maintenance) to Divisional Operating Superintendent, Manchester, 1944, in which position he was confirmed in 1946, then District Motive Power Superintendent, Llandudno Junction, 1948, and District Motive Power Superintendent, Kentish Town, in 1951.

Mr. H. Eagers, District Engineer, Hull, North Eastern Region, British Railways, who has been appointed District Engineer, Perth, Scottish Region, was educated at King Edward School, Sheffield, and Jesus College, Oxford. He joined the London & North Eastern Railway at York in 1930, and, after holding positions in all sections of the Civil Engineer's Office, North Eastern Area, and District Offices, was appointed Assistant District Engineer, Darlington, in January, 1948, and District Engineer, Hull, in December, 1950. During the 1939-45 war, Mr. Eagers saw service with the Transportation Branch, Royal Engineers, and spent four years in India, where he was latterly at General Headquarters engaged in the planning of railway developments for service requirements, with the rank of Lieutenant Colonel.

Mr. R. M. Davies, G.M., A.M.I.Mech.E., A.M.I.Loco.E., who has been appointed District Mechanical Engineer, East African Railways & Harbours, was educated at King Edward's Grammar School, Birmingham, and at technical colleges at Crewe and Birmingham. After serving an apprenticeship with the London Midland & Scottish Railway at Crewe, he was appointed Assistant Locomotive Superintendent on the Palestine Railways in 1943. In 1948 he accepted an appointment as Assistant Locomotive Superintendent on the East African Railways & Harbours. Mr. Davies is at present stationed at Eldoret.

Mr. George Groome, Assistant Purchasing Agent, Liverpool, Canadian Pacific Railway, who, as recorded in our August 21 issue, has been appointed Purchasing Agent, London, joined the Allan Line in Liverpool in 1906, that company later being absorbed by the Canadian Pacific. He served in the King's Liverpool Regiment throughout the 1914-18 war, returning to the Liverpool accounting office in 1919. He was transferred to the purchasing department in London in 1921, moving to Southampton in the following year when the Canadian Pacific first opened an office there, until it was bombed out in 1940, when he returned to Liverpool. He was appointed Assistant Purchasing Agent, with his office in Liverpool, in 1945, the post he now vacates upon his promotion.

We regret to announce the death in Santiago del Estero, Argentina, resulting from an accident, of Mr. Anthony Talbot, Assistant Chief Engineer, General Belgrano Railway. Mr. Talbot was for some time Assistant Sectional Engineer at Córdoba of the Central Córdoba Railway, becoming subsequently Assistant Signal & Telegraph Engineer and District Engineer at Rosario.

After the purchase of the Central Córdoba Railway by the Argentine Government, he became Assistant Chief Engineer. While on an inspection trip in that capacity, the railcar in which he was travelling derailed killing Mr. Talbot and injuring two other civil engineers who were accompanying him.

We regret to record the death, on September 10, of Mr. Michael Joseph V. O'Neill, Works Manager at Inchicore of Coras Iompair Eireann since 1949. Mr. O'Neill was born in Cork in 1892. After his education at the Christian Brothers College, Cork, he completed an engineering apprenticeship in the Locomotive Department of the Great Southern Railway in 1918. Two years later he was appointed a Carriage & Wagons Inspector. In 1924 he was made a Works Assistant at Inchicore and, in 1945, Assistant Works Manager. In 1949 he was promoted to be Works Manager. He was keenly interested in the new carriage building project at Inchicore which he was himself responsible for innovating.

Mr. F. O. Ellis, Sole Purchasing Agent in the United Kingdom and Europe of Rede Ferroviária do Nordeste do Brasil (formerly the Great Western of Brazil Railway) left London last week for a business tour of Canada.

Mr. A. Towle, A.M.I.Mech.E., A.M.I.Loco.E., has been appointed District Mechanical Engineer, East African Railways & Harbours. He was educated at Derby Central School and Derby Technical College. He served an apprenticeship at the Derby works of the London Midland & Scottish Railway and joined the Tanganyika Railways in 1945 as Assistant Locomotive Superintendent. Mr. Towle is at present stationed at Mombasa.

The following appointments have been made on the Argentine National Railways:—

D.F. Sarmiento Railway: Mr. A. Lombardi to be Acting Chief of the Stores Department, Mr. Oscar Arditi to be Acting Chief of the Mechanical Department, and, following on the transformation of the Electrical Division of the Mechanical Department into an autonomous department, Mr. Samuel J. Murúa to be Chief of the Electrical Department.

General Urquiza Railway: Mr. J. Biagosch to be Chief of the Supply Department.

General Roca Railway: Mr. Francisco Daudé to be Chief of the Stores Department.

General San Martín Railway: Mr. Evan Roberts to be Chief of the Traffic Department.

The Minister of Transport has appointed the Duke of Richmond and Gordon, who is a representative of local authorities, to be a member of the Transport Users' Consultative Committee for the South-Eastern area, in place of Colonel Granville Walton, who has resigned.

Mr. R. L. Bingham, Assistant to the Stores Superintendent, Western Region, British Railways, whose retirement was recorded in our September 11 issue, entered the service of the former Great Western Railway in the Stores Department at Swindon in 1905. Mr. Bingham was the first student from this Department to obtain the G.W.R. Chairman's prize at the Swindon College. He later studied at the London School of Economics, gaining distinction in

accountancy, business methods and commercial and railway law. In 1914, Mr. Bingham enlisted in the Royal Wiltshire Yeomanry and served in France until 1916, when he was transferred to General Staff Intelligence at XV Corps Headquarters. On returning to the company's service, he gained experience in various sections of the Department and, in 1928, was appointed Clerk-in-Charge of Accounts. Five years later he became Chief Order Clerk and, in 1943, was transferred to the General Stores where, after a period as Deputy Storekeeper, he was promoted Storekeeper. In 1947, he was appointed Assistant to the Stores Superintendent. At a large gathering in the Head Office at Swindon, which included Mr. A. G. Roberts (whose own retirement from the post of Assistant Stores Superintendent was recorded in our July 24 issue) and representatives from various depots of the department, Mr. Bingham was presented by Mr. H. R. Webb, Stores Superintendent, with a wallet of notes to mark the occasion.

Mr. K. R. M. Cameron has been appointed District Motive Power Superintendent, Kentish Town, London Midland Region, British Railways.

Mr. K. A. Kindon, District Passenger Superintendent, Sheffield, Eastern Region, British Railways, has been appointed District Commercial Superintendent, Middlesbrough, North Eastern Region.

Mr. G. L. Laurenson, Commissioner of Transport, New Zealand Government, will retire later this year, after 42 years in the public service. He has been head of the New Zealand Transport Department for the past 16 years.

Mr. F. G. Streatfield, Freight Agent at Liverpool, Canadian Pacific Railway, will retire under the Company's Pension Rules on September 30, 1953. He will be succeeded as Freight Agent, Liverpool, by Mr. H. McBride.

Mr. W. J. Price, Chief Assistant to Divisional Transport Officer, North Eastern Divisional Coal Board, has been appointed Divisional Transport Officer, in succession to Mr. W. Cole, whose retirement was recorded in our August 14 issue.

We regret to record the death, on August 26, as a result of poliomyelitis, of Mr. F. P. I. Crossley, youngest Director of Crossley Bros., Ltd., and the grandson of and heir to Sir Kenneth I. Crossley, the Chairman of the Company. Mr. Crossley joined the Board on September 19, 1950.

We regret to record the death, on September 10, of Mr. Curtis W. McGraw, Chairman of the McGraw-Hill Publishing Co. Ltd., London. Mr. McGraw was Chairman of the Board, and President of McGraw-Hill Publishing Co. Inc., New York.

We regret to record the death, on August 26, of Mr. Walter Skelton Hudson, Chairman of Robert Hudson Limited. Mr. Hudson was actively engaged in the business up to the date of his death, and had served the company for more than 60 years.

Mr. Thomas A. Holme, who has been closely associated with the development and production of fabricated structures in the electrical industry for the last twenty-five years, has retired from the British Thomson-Houston Co. Ltd.

Ministry of Transport Accident Report

Riccall Crossing, July 16, 1952: British Railways, North Eastern Region

Colonel R. J. Walker, then Inspecting Officer of Railways, Ministry of Transport, inquired into the accident which occurred at 7.59 p.m. on July 16, 1952, at the Riccall public level crossing about 10 miles south of York, when the 4.45 p.m. "Tyne-Tees Pullman" express from London, consisting of 8 coaches drawn by an "A4" 4-6-2 engine, left-hand drive, approaching under what were clear signals until the last moment and running at about 60 m.p.h., destroyed the gates and completely wrecked a motorcar, killing both occupants instantly. It was a fine clear day with dry rails. The accompanying diagram shows the lines, signals, and other details essential to an understanding of the case.

The crossing is continuously manned, day and night, and has a 7-lever frame and gate wheel, with telephone, repeating bell in the block bell circuit, and

circuit 1,014 yd. to the north of Escrick South box.

Riccall South may not clear his down distant until the gate cabin distant has been cleared.

The Course of Events

About 7.53 p.m. the gatekeeper heard the special "train approaching" signal for an up goods train, closed the gates and pulled off his signals. Then, or immediately after, he heard the down express offered and accepted and he pulled off for that also. "Entering section" from Riccall North was sent at 7.56 and two minutes later the goods train passed. Two cars had approached from the Selby direction as the gates were closed, and as the up distant lever was being replaced one hooted. The gatekeeper, momentarily forgetting the down train, replaced all his signal levers and opened the gates. The

stood the signals for the two trains, but as soon as the up train had passed he momentarily forgot the down, restored both lots of signals and started to open the gates. He suddenly remembered the down train, but a car was about to come across. He shouted and beckoned to the driver to hurry, but it stopped on the track. He could not say why and did not think it was due to the gates. They were almost fully open when the train ran through. (Tests showed that a car following the down side gate as it opened would not be impeded by the swing of the up.) The gatekeeper was unable to account for the lapse and, although he had been talking to a friend while the up train was passing, did not think this, or anything else, had distracted his attention. He had not been feeling fit for some time but had not seen the doctor because he had a large family and wanted to carry on. He had private worries from illness in the

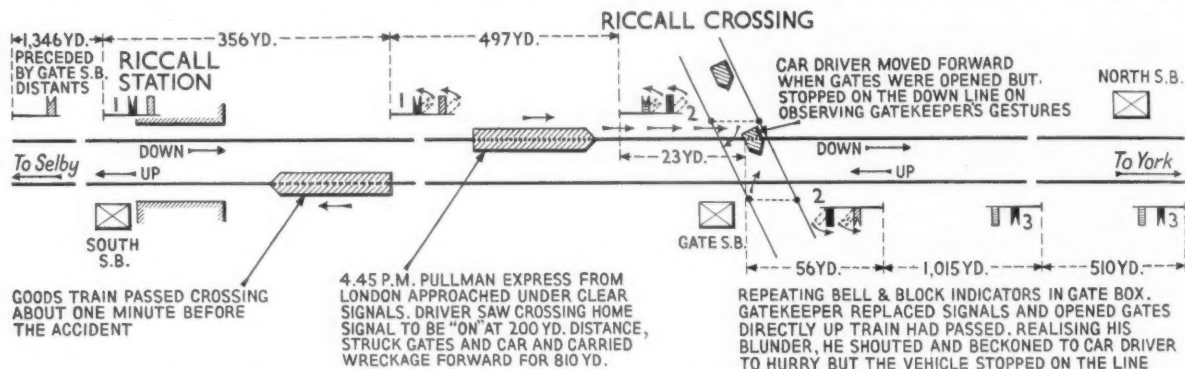


Diagram showing circumstances of accident at Riccall Crossing, North Eastern Region, July 16, 1952

3-position indicators in the block circuits, giving continuous indication of the state of the sections. In addition, all signals between Riccall North and South boxes are repeated in the gate cabin. There are two single gates and wickets. Both rail and road carry considerable traffic.

From the down side an approaching down train can be sighted at about 800 yd. but if another is on the up line between the crossing and the station, as happened on this occasion, the view becomes about 250 yd. With left-hand drive the driver of a down train sights the crossing at about 200 yd. From the other direction both rail drivers and road users can see for over a mile.

The instructions state that in clear weather the gates may be allowed to stand across road or rail, until required to be altered. They may remain across the railway:—

- for down trains until "line clear" is indicated, or for certain specified classes of slower moving goods trains, until a telephone message is received from Turnhead Level Crossing, over a mile and a half away, that the train is approaching it.
- for up trains until a special bell signal 1-2-1 "train approaching" is given to Riccall South box by either Escrick South or Riccall North box. This signal is sent as soon as a train occupies a track

first car followed on to the crossing. Realising the mistake, the gatekeeper beckoned to its driver and shouted to him to cross quickly. Either because he saw the man waving, or the approaching express, he unfortunately stopped on the down line. The wrecked vehicle was carried forward half a mile.

Evidence

An inspector found the signalling apparatus at the crossing to be in proper order.

The driver of the express said he had all signals clear until sighting the crossing home at danger at 200 yd. He made a full brake application but it was impossible to stop clear.

The signaller at Riccall South gave "entering section" for the express at 7.58; the goods train was just approaching the up home signal. When the engine of the express was level with the starting signal he saw the gate inner distant return to "caution," and at once threw back the starting arm. Soon after the gateman telephoned that the train had run through the gates and hit a car; he was too upset to say more.

The gatekeeper, 54, with 32 years' railway service, was originally on the permanent way staff, but following an illness was transferred to the lighter duty in 1936. He had been at this crossing for 16 years. He said he heard and under-

family. He was not a robust type, characteristically or physically, but medical examination revealed nothing rendering him unfit for duty.

The accident was witnessed by a man working in a field 150 yd. away who said that after the up train passed he saw two cars waiting. He noticed the down train when it was about 250 yd. away when the gates opened and the leading car moved forward and stopped, but the gates continued to open. One car hooted after the goods train passed.

The gatekeeper's friend said he had been asked to bring back the cricket scores and reached the cabin as the up train was approaching. Standing on the steps he gave them to the gatekeeper while the train passed and was going down when he heard him shouting. He then saw the car on the crossing. He thought the driver was looking at the cabin. His back had been towards the down train and cars and he did not notice the bell signals or the gatekeeper's actions while talking to him, he thought, for about 3 min. He had frequently given him sports news while on this shift, usually written down, but he had mislaid them for the moment and gave the paper to the gatekeeper after speaking to him.

The stationmaster at Riccall South said the gatekeeper had been under his supervision for five years and carried out his

duties conscientiously, safely and properly. He regarded him as a good, reliable, and very obliging type.

The District Operating Superintendent said all his information confirmed this opinion.

Inspecting Officer's Conclusion and Remarks

This accident was caused by simple human failure. The gatekeeper's mistake was no sooner made than recognised and an attempt made to remedy it, but circumstances made the accident inevitable. No doubt had the car continued to move it would have escaped. Probably it stopped because the driver had seen the gatekeeper beckoning and not understood what he meant. Little is to be gained by speculating at length on the reason for the error. He was quite unable to account for it. It may have been the goods train passing and hiding the express from view, or the sounding of the car horn after it had passed, or that the gatekeeper's concentration was temporarily relaxed by his conversation. Lastly, his physical condition and private troubles may have had a bearing on it. Most probably all these factors contributed.

All this serves only to explain but not excuse the mistake; the accident, however, caused the deaths of two persons and might have been even more serious had the train been derailed.

[The gatekeeper was convicted of manslaughter at York Assizes in November, 1952, and sent to prison for 9 months.]

ABOLITION OF SECOND CLASS ON BELFAST-BANGOR SECTION OF U.T.A.—On and from Monday, September 21, second class on the Belfast-Bangor section of the Ulster Transport Authority will be abolished, and from that date accommodation will be first and third class only. The existing fares for first and third class travel will continue to apply. A revised scale of rates for season tickets is to be introduced covering periods of one week, one month, and any period up to twelve months.

L.M.R. CRICKET COMPETITION FINAL.—The final of the London Midland Region Cricket Challenge Cup Competition will be played at Derby on September 19 between Crewe Sports Club "A" team and Chaddesden. The Sports Club hopes to retain the trophy at Crewe; it was won last year by Crewe Signal and Telegraph C.C. Mr. J. W. Watkins, Chief Regional Officer, will present the Sir Frederick Harrison Cup to the winners and the Officers' Cup to the runners-up.

EUROPEAN TRANSPORT MINISTERS' CONFERENCE.—Monsieur P. W. Segers, Belgian Minister of Communications, has invited the transport ministers of the member countries of the Organisation for European Economic Co-operation, and those of Spain and Yugoslavia, to take part in a Conference to meet in Brussels in October. The purpose of this Conference, which was the subject of a recent recommendation by the Council of O.E.E.C., is to establish on a permanent basis the European Conference of Transport Ministers. The Governments of the United States and Canada have been invited to send observers. When they meet in Brussels the ministers will have before them the report of the Conference on European Inland Transport, which took place recently at the Château de la Muette under the chairmanship of Monsieur Attilio Cattani, Chairman of the O.E.E.C. Executive Committee.

I.R.S.E. Visit to London Transport Installations

Power operated boxes inspected at North Acton, White City, and Ealing Broadway

The autumn meeting of the Institution of Railway Signal Engineers was held on September 5, when, by the courtesy of Mr. R. Dell, Signal Engineer, London Transport Executive, and a Past President, members visited installations at White City, North Acton, and Ealing Broadway. The party, numbering about 70, was led by the President, Mr. T. Austin, supported by the Vice-Presidents, Messrs. J. H. Fraser and E. G. Brentnall. Others present included Messrs. S. Williams and T. S. Lascelles, Past Presidents; Messrs. W. Owen and M. Le Sueur, Members of Council; Mr. V. S. King, Hon. Editor; with Mr. P. Guyatt, Hon. Secretary, General Purposes Committee, responsible for the arrangements. Descriptive folders were distributed to the party who inspected the signalboxes and relay rooms at the three locations.

The installations are of the remotely controlled power-operated lever type, introduced by Mr. Dell, of which there are now six on L.T.E. lines, Ealing Broadway being the latest. This was described in *The Railway Gazette* of November 28, 1952. The North Acton signalbox was built before the war, but was not the first of the type to be brought into service, as the work had to be interrupted. The junction between the lines to Ruislip and Ealing at this point is controlled from the ordinary power-lever frame at White City, North Acton box being normally not staffed, over a distance of 2½ miles. This is effected over multicore cables and telephone type relays, but no interlocking or other safety features are involved in this portion of the equipment. At the far location there is a power frame with the miniature levers operated by air cylinders, acting exactly as if handled directly by a signalman, which can indeed take place in an emergency, after cutting off the air. These levers are mechanically interlocked and control standard signalling circuits, using standard signalling type relays, giving all the safety features required, independently of the remote control. By this means the safety circuits are kept extremely simple and straightforward without the complications inherent in "relay" interlocking, while the mechanical locking provides a positive safeguard at the point where the controlling and safety circuits meet. Faults are very readily located with this arrangement.

Route Setting at Ealing Broadway

At Ealing Broadway such control is actually purely local, between the signalman's room and the air operated frame in another below, but the principle of working remains the same. Instead of the signalman operating miniature levers, however, he has a desk of push-buttons, each allocated to a particular movement, and route setting is applied. It suffices to actuate a button to set up an entire route and clear the signal for it, if conditions permit. In addition controls can be pre-set and a conflicting route button depressed while a movement is in progress. Immediately conditions allow such second route will become automatically set up and signalled, accelerating the working and rendering the signalman's task easier. The visitors were much impressed with the neat design and excellent finish of the equipment, as well as the layout of the relay rooms, wiring, lighting, and other features of the installations. The complete absence of noise from the a.c. relays was very noticeable.

At White City the visitors were shown a much improved type of electro-pneumatic trainstop incorporating automatic forced lubrication, intended to work without mechanical attention between general overhauls.

A track side terminal box of improved design, with 10-core cable for connections to the train stop, also was on view, together with new methods of terminating cables at the power rails, using vulcanised coverings made on site in electrically heated moulds; an improved form of 3-core screened lead-covered cable; sets of relays as used for remote control and train description work; and a new completely sealed form of telephone relay in gas-filled transparent cover, intended to eliminate the dust difficulty. These improvements are typical of the close attention being paid to details of design in the constant endeavour to reduce failures in service.

Mr. Austin, after luncheon at the Chiswick Works canteen, thanked the London Transport Executive, Mr. Dell, and his staff for a most instructive and enjoyable morning. The Signal Department, he said, played an important part in the wonderful organisation known as London Transport. He stressed the value of visits to the relay rooms and of seeing such fine work being done so efficiently. As a long-term policy, that was the really economic course to pursue. They had to thank a number of Mr. Dell's staff, among them Messrs. W. H. Challis, W. Owen, and B. Reynolds, the last being their Honorary Treasurer, for their services in making the visit so successful.

Remotely-Controlled Power Lever System

Mr. Dell, replying, expressed the gratification of the London Transport Executive that the Institution had visited the installations in which they could see the progress made with the remotely-controlled power lever system, culminating in its latest form at Ealing Broadway. He hoped they would be able to extend it in due course. It raised the controversy as to whether mechanical interlocking should be retained or not; the system was based on using that locking to provide for the safety of the signal circuits and separate them from the purely operating ones.

They found mechanical locking probably their most reliable piece of equipment, he added. It needed proportionately less maintenance than any other. It seemed a pity not to continue to take advantage of such very useful and comparatively simple apparatus.

Mr. Dell thought there was room for an improved form of it. What they were using was apparently no advance on the practice of 30 or 40 years ago, but if it could be designed to be made on a mass-production basis it might be possible to assemble it with a screw-driver, without having to have the fitter with his drills, files, and so on.

Made in that way mechanical locking would show advantages in reliability and in ease of modification, not supposed to belong to it today; he threw out that thought for consideration.

Mr. J. H. Fraser, Senior Vice-President, expressed the thanks of the members to the General Purposes Committee for the work done on the Institution's side in organising the meeting.

Lightweight Diesel Trains for West Cumberland Services

Second area selected in development programme

Multiple-unit lightweight diesel trains are to replace local steam trains on some London Midland Region lines in West Cumberland. This is the second area to be selected in giving effect to the policy, announced last November, to use such units wherever suitable to reinforce or replace steam services; the first area selected was the West Riding of Yorkshire.

The West Cumberland scheme, which is expected to come into operation in the autumn of 1954, will cost over £330,000, and provides for the diesel units to work local services on 120 miles of route between Carlisle and Whitehaven, Carlisle and Silloth, Workington and Penrith, and Carlisle and Penrith. This includes the industrial district of West Cumberland, agricultural areas, and the holiday resorts of Silloth and the northern part of the Lake District.

Use of the units will permit an hourly service between Carlisle and Whitehaven—an increase of about 50 per cent. The present Carlisle-Silloth and Workington-Penrith services will be operated by the

diesel units, the former augmented by steam trains when necessary, and an additional service (two on Saturdays) will be provided each way between Carlisle and Penrith.

Two-Coach Units

The new diesel units will be of similar design to those now being built for use in the West Riding, and described in our November 14, 1952, issue. Each will consist of two coaches, one powered by two 150-h.p. bus type engines beneath the floor; they will be fitted for driving from either end and it will be possible to couple them to form trains of up to eight coaches. They will have bus type seating for about 130 passengers per unit, toilet, and space for parcels and luggage.

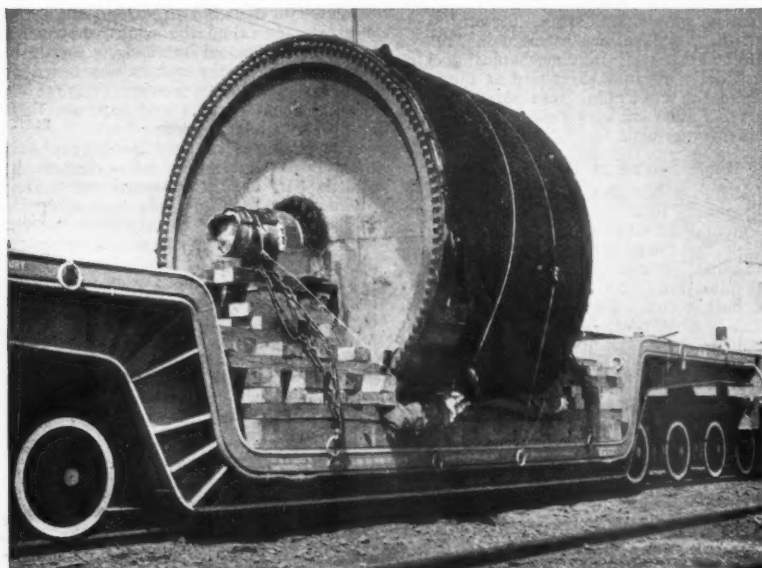
Orders have been placed with A.C.V. Sales Limited for thirteen sets of power equipment for the West Cumberland diesel services. The coaches to which the power equipment will be fitted, and the thirteen trailer coaches required to make up the two-coach units, will be built in British Railways workshops at Derby.

Transport of Out-of-Gauge Load in India

The Eastern Railway, India, has conveyed from Calcutta Docks to Dalmianagar (Dehri-on-Sone) a glazing cylinder machine of 13 ft. 8½ in. in dia. and 15 ft. 9 in. long, weighing 45 tons and the bulkiest consignment ever moved on the Indian railways. The transport presented a problem as the normal vertical and horizontal clearances over the Eastern Railway are 16 ft. and 14 ft. from all overhead and side structures, respectively. The cylinder was loaded on a special well wagon with floor

height of 2 ft. 1 in. above the rail level. This meant that the consignment had a minimum gross clearance of only 1½ in. in height and 1½ in. on either side from all overhead and side structures.

Normally there is a ban on transport of any consignment which has a net clearance of less than 3 in. all round. Consequently, elaborate special arrangements were made for movement of the cylinder in safety by stages, as no goods trains could be allowed to pass it while it was in transit. Civil and mechanical engineers of the Eastern Railway escorted the load to destination, observing special precautions laid down for its transit by the Railway Board.



Glazing cylinder weighing 45 tons being transported by the Eastern Railway, India, from Calcutta Docks to destination

Open-Top, Tractor-Drawn Scrapers

A series of open-top, tractor-drawn, rubber-tyred scrapers ranging in capacity from 10.5 to 28.5 cu. yd. is announced by the LeTourneau-Westinghouse Company, Peoria, Illinois. These scrapers are designed in four sizes. The 0-14 Carryall scraper, which is designed for use with tractors of 70 h.p. or more, has a struck capacity of 8.1 cu. yd. and a heaped capacity of 10.5 cu. yd. The 0-19 Carryall scraper, for use with 75 or more h.p. tractors, has a struck capacity of 12.2 yd. and heaped capacity of 16 yd. The third size of the open-top line, 0-23 for use with 80 or more h.p. tractors, carries a struck capacity of 14.4 yd. and a heaped capacity of 19 yd. The 0-35 Carryall scraper carries a load rating of 22.5 yd. and 28.5 yd. heaped and is designed for 100 or more h.p. tractors.

Construction is welded throughout and the design facilitates shovel or conveyor loading by elimination of overhead cables. Operation is by a double drum power control unit, of which two cables work through swinging sheaves which are self-aligning. They are mounted on the front of the scraper yoke. Construction of the goose-neck allows clearance for various tyre combinations.

Other features are positive ejection of material, heavy-duty roller bearings protected by oil seals, and a hard-surface, self-sharpening, reversible blade.

Dormitory Cars on French Railways

The French National Railways will place in service between November 15 and March 15 a limited number of special coaches providing dormitory-type sleeping accommodation suitable for parties of young people, particularly winter sports parties, travelling between Paris and destinations in France. The traffic for which these coaches are designed is principally that to and from the winter sports centres in the French Alps and the Pyrenees. They will not be available for journeys to and from other countries.

In each of these vehicles, which are separated into two large compartments by a central platform, there is a total of 60 berths of metal construction provided with a mattress, pillow, and blanket. Berths are arranged in tiers of three along the sides of the coach, with another tier of two along the centre. Special racks are provided for baggage and there is a toilet compartment at each end of the coach.

The fare charged for travel in these coaches is the third class party fare, 30 or 40 per cent reduction on the ordinary fare according to the number in the party, plus half the ordinary supplement for a couchette berth, 10s. 6d. per berth or £31 10s. per coach, in each direction.

LOWER PROFITS FOR HURST, NELSON & CO. LTD.—The trading profit for the year ended March 31 of Hurst, Nelson & Co. Ltd. amounted to £70,102, against £89,649 for the previous year. The ordinary dividend for the year is reduced from 20 to 15 per cent, but the board proposes payment of 2½ per cent, tax free, from the dividend equalisation fund for ordinary shares.

Staff & Labour Matters

Railway Wage Claims

At a meeting on September 15 between representatives of the Railway Executive and representatives of the N.U.R., A.S.L.E.F., and T.S.S.A., the Railway Executive declined the claim for a 15 per cent increase in the rates of pay of railway salaried and conciliation staff.

The union representatives expressed disappointment with this reply, and indicated that in the circumstances it would be necessary for them to pursue the claim to the next stage of the negotiating machinery.

Later, the same day, a meeting of the Railway Shopmen's National Council considered a similar claim on behalf of railway workshop staff.

The following statement was issued after the meeting:—

"At a meeting of the Railway Shopmen's National Council today the representatives of the Railway Executive declined the claim of the employees' side of the Council for an increase of 15 per cent in the rates of pay of railway workshop staff.

"The employees' side representatives expressed disappointment with this reply, and indicated that it would be necessary for them to give consideration to the position which had been reached."

T.U.C. Wages Policy

At the Trades Union Congress meeting in Douglas last week a representative of the Post Office engineering unions moved a composite resolution rejecting any form of wage restraint which might interfere with the freedom of collective bargaining and independent arbitration. It urged the General Council to make a vigorous attempt to force the Government to stabilise the cost of living, if necessary by the reintroduction of food subsidies. It was claimed that there had been a decline of 9 per cent in real wages since 1946, and in that period productivity had risen by more than 25 per cent.

Mr. Arthur Deakin for the General Council spoke in support of the resolution. He said that the rank and file had long been concerned at the failure of successive Governments to grapple with the question of prices, even allowing for the circumstances which made it difficult for them. If it was not possible to get a Government able and willing to take care of price levels, and the result was that the wages of the people buy less, then they would expect the compensation to which they were entitled.

This resolution was passed unanimously, but a second resolution proposed by the General Secretary of the Electrical Trades Union was defeated. This asked the T.U.C. to reject wage restraint completely and to support actively the efforts of unions to defend the standard of living of their members by vigorous campaigning in favour of higher wages. The proposed resolution claimed that increased wages were justified by the rising cost of living, to make up the leeway already lost on the increased production figures; wages could still come from profits and need not be reflected in increased prices.

BARSI LIGHT RAILWAY COMPANY FINAL DIVIDEND.—The directors of the Barsi Light Railway Co. Ltd., have decided to recommend, at the forthcoming annual general meeting on October 21, a final dividend on the ordinary stock in respect of the half-year to March 31, 1953, of 2 per cent, actual, payable on October 29, less income tax at 9s. in the £.

Contracts & Tenders

Coras Iompair Eireann is inviting tenders for diesel-electric or diesel-hydraulic locomotives. Full details appear under Official Notices on page 335.

An order has been placed with the Metropolitan-Cammell Carriage & Wagon Co. Ltd. for 70 all-steel bogie low-side wagons for the Nigerian Railway, to be built to the supervision and inspection of the Crown Agents for the Colonies.

N.V. Machinefabriek Du Croo & Brauns, Amsterdam, has received an order for 500 four-wheel covered goods wagons, with bodies of galvanised sheeting, for the Burma Railways. They are to be supplied fully erected early in 1954.

The Special Register Information Service of the Export Services Branch, Board of Trade, reports that the closing date for the call for tenders for axles, tyres and wheels, issued by the Department of Supply & Development, Government of Pakistan, details of which were given in our August 7 issue, has been postponed to September 21.

Under the present system of payment in respect of contracts, the South African Railways have usually effected settlement through the overseas firm's representative in the Union. The Special Register Information Service of the Export Services Branch, Board of Trade, announces that the South African Railways Tender Board has stated that it is prepared to consider payment, to the extent of 90 per cent of the accepted value of the tendered goods, direct to the account of a United Kingdom firm, should the latter desire.

This new procedure will accelerate payment so far as the manufacturer is concerned as well as entailing some saving in exchange charges, and United Kingdom firms wishing to take advantage of this facility should intimate to South African Railways when submitting their tender through their local representative that they would prefer payment to be made to a nominated account in the United Kingdom.

The Special Register Information Service, Export Services Branch, Board of Trade, announces that the Branch has received information from the Office of the High Commissioner of India in London about a call for tenders, No. SRI/16587-D/III, issued by the Director-General of Supplies & Disposals, Railway Stores Directorate, New Delhi, for the supply of 400 draw hooks, dead soft steel or Class I steel.

The closing date for receipt of tenders is 10 a.m. on September 24, 1953. Tenders should be sent on the prescribed forms to the Director General of Supplies & Disposals, Shahjahan Road (Section SRI), New Delhi, quoting reference SRI/16587-D/III.

Tender forms are only available for purchase in India from the Deputy Director General (Supplies), Directorate General of Supplies & Disposals, New Delhi, Director of Supplies & Disposals, Bombay or Calcutta, or Deputy Director of Supplies & Disposals, Madras.

If the date for the receipt of tenders does not allow sufficient time for United Kingdom firms to obtain tender forms from India, quotations may be submitted on the tenderer's own form or by telegram, provided essential particulars are given and tender forms are simultaneously applied for and returned as quickly as possible duly completed on the basis of advance quotations already submitted. A copy of

the tender form may be examined at the Railway Branch of the India Store Department, 32-44, Edgware Road, London, W.2.

Notes and News

Works Manager Required.—Applications are invited for the post of works manager required by a rolling stock works in the East, specialising in the production of all steel railway vehicles. See Official Notices on page 335.

Senior Assistant in Office of Assistant Civil Engineer (Permanent Way) Required.—Applications are invited for the post of Senior Assistant, office of Assistant Civil Engineer (Permanent Way) required by the London Transport Executive. See Official Notices on page 335.

Institute of Transport Presidential Address.—Mr. John Elliot will deliver his Presidential Address to the Institute of Transport at the meeting to be held on Monday, October 5, at 5.45 p.m. at the Jarvis Hall, 66, Portland Place, London, W.1.

Runaway Wagons on Southern Region Line.—Forty-six wagons which broke away from a goods train travelling between Deal and Dover on September 11 were stopped by the guard without incident, some way from the level crossing at Deal. The driver of the train stopped and walked back to the wagons.

Abandonment of U.T.A. Lines.—The Ministry of Commerce for Northern Ireland has authorised abandonment of certain lines of the Ulster Transport Authority, including the Ballymoney-Ballycastle, Draperstown Junction-Draperstown, and most of the Limavady-Dungiven, Ballyclare, and Macfin sections.

Thomas Tilling Acquisition.—Thomas Tilling Limited has purchased a controlling interest in Bagshawe & Co. Ltd., of Dunstable, manufacturers of conveyor and elevator equipment and of malleable iron chains and castings. The management of the company will remain unchanged.

New Record in British Railways Locomotive Maintenance.—The latest statistics available, for the four weeks to June 13, show that the average mileage run by British Railways locomotives between mechanical failures was 32,878, compared with 19,174 for the corresponding period in 1949, 20,365 in 1950, 26,319 in 1951, and 32,183 in 1952. This improvement is stated to be due to the introduction of the standard examination system throughout British Railways, which provides for better maintenance.

Heat-Producing Fuel Burning Units.—Smiths Industrial Instruments Limited has evolved a new fuel burning unit for producing heat, which was exhibited at the recent Engineering & Marine Exhibition at Olympia, London. It can be applied to a variety of industrial and traction uses. Two types are available. In the first instance, an air heater in which the heat generated by burning diesel fuel is imparted to air through a stainless steel heat exchanger. This application can be used for heating buildings and railway coaches. In the second type, a liquid heater, the heat is imparted to water or other suitable fluids through a heat exchanger. It can be used for pre-heating engine coolants or engine oil in diesel engines to improve starting. Other examples are hot water re-

quired quickly and in quantities and thinning fluids to aid flow. The output is in the region of 50,000 B.T.U. per hour for the air heater, which is already in production. The liquid heater should be in production early next year.

Best Kept Station Competition.—The photograph of Styal Station reproduced on page 306 of our last week's issue was referred to as of the best kept station on British Railways. This should of course have been the best kept station garden in the Manchester (Western) Operating District of the London Midland Region. The station garden competition in the London Midland Region was divided into 28 competitive areas, a number of prizes being allocated to each area according to the number of stations entering the competition.

Powell Duffryn Limited Results.—The directors of Powell Duffryn Limited announce that the annual general meeting will be held on October 21. The consolidated net profit for the year ended March 31 is £556,883 (against £731,686 for the previous year) after crediting transfer from taxation reserves £50,000 (£51,704) and after charging depreciation £361,132 (£347,467), and tax £920,027 (£1,253,045). Payment is recommended of a final dividend of 5 per cent actual, less income tax at 9s. in the £, on the £9,660,471 ordinary stock in respect of the year ended March 31, making with the interim dividend of 3 per cent actual, paid on February 24, 8 per cent for the year. The amount at the credit of the consolidated profit and loss appropriation Account to be carried forward to 1953/54 is £2,208,285 (£2,174,673).

Antofagasta (Chili) & Bolivia Preference Dividend.—The Antofagasta (Chili) and Bolivia Railway Co. Ltd., announces a further payment of 2½ per cent against preference dividend arrears. The balance of £447,594 on net revenue account for 1952 to be carried forward to 1953 compares with £448,551 brought in. The directors point out that net revenue was

arrived at after taking into account loss on exchange, debenture interest, tax provision of £305,303 (£658,434), renewals £71,540 (£183,792), contingencies £75,000 (£100,000), and payment of arrears for the years 1944 and 1945 on the 5 per cent cumulative preference stock. An exchange loss of £400,000 has been incurred in 1953 because of the exchange rate alteration in Bolivia. The transfer of £378,751 from contingencies reserve and the balance from net revenue are the provisions made. Payment of 2½ per cent on account of arrears of dividend in respect of the second half of the year 1945 on the 5 per cent cumulative preference stock will be made on October 14.

Motor Rail Limited: Increased Output.—Presiding at the recent annual general meeting of Motor Rail Limited, the Chairman, Mr. J. D. Abbott, M.B.E., M.I.Mech.E., said that the output of the company's Simplex diesel locomotives and Motor Rail diesel dumpers had again shown an increase. The net profit for the year, after providing for taxation, has been increased by £10,323 to £27,743, and to this must be added £1,084 surplus on sale of fixed assets, making a total available surplus of £28,827. Tax provision includes the sum of £10,600 for E.P.L. The directors' proposal to increase the dividend for the year by 2½ per cent to 12½ per cent, less tax, was adopted.

Wagon Repairs Limited: Higher Turnover.—For the year ended March 31, 1953, the turnover of Wagon Repairs Limited increased, but reduced charges for work done for British Railways reduced profit margins on that section of the company's work. Savings have been made through reorganisation and concentration of outside repairing depots, and by pruning of costs. The Chairman, Sir Leslie Boyce, in his statement issued with the accounts, has said that it is hoped that these savings will eventually offset to some extent the effect of the reduction in prices. Group trading balances were £599,480, against £602,967. Tax charges were £388,319 (£415,067), and included £80,786 (£90,562) future liability

to profits tax on undistributed profit. Depreciation was allotted £42,195 (£33,724, plus £25,750 special), the net profit rising from £118,592 to £162,454. The amount charged as special depreciation for the four years to March 31, 1952, has been reallocated and the balance of £85,975 has been transferred to capital reserves. Dividends paid on the £529,008 ordinary capital were maintained at 20 per cent, less tax, but it is proposed to distribute, in addition, 2d. per 5s. unit, not subject to tax, from surplus arising on liquidation of subsidiaries.

Tube Investments Limited acquire W. H. A. Robertson & Company.—Tube Investments Limited announce that agreement has been reached subject to the completion of formalities for the acquisition by Tube Investments Limited of W. H. A. Robertson & Co. Ltd. The latter firm, with works at Bedford, specialises in the design and manufacture of rolling mills for all metals in hot and cold state, ancillary rolling mill machinery, wire drawing machinery, tube manufacturing machinery, threading equipment and general engineering components; and it is engaged in the design and manufacture of new plant for the development of industry in this and other countries. Its acquisition represents a further expansion of the activities of Tube Investments Limited into the field of capital equipment manufacture. Like all Tube Investments subsidiary companies, W. H. A. Robertson & Co. Ltd. will continue to operate as a separate entity.

Engineering Work at Retford and Bawtry.—British Railways, Eastern Region, state that because of engineering work at Retford and Bawtry from 3.30 a.m. on Sunday, September 27, to 3.30 next morning, all services between Kings Cross, Grantham, Doncaster, and the North will be diverted to run via Grantham, Lincoln, Gainsborough Lea Road, and Doncaster. A special service will be run between Grantham and Newark North Gate and between Retford and Lincoln and Gainsborough Lea Road to connect with trains normally booked to call at Newark and Retford. Buses will operate between Newark North Gate and Retford for local passengers and passengers from Kings Cross, Peterborough, and Grantham. There will be delay to all trains because of the diversion.

Lengthman's Bravery Recognised.—The unsuccessful efforts of a lengthman to rescue a colleague from the path of an oncoming passenger train were praised by Mr. K. W. C. Grand, Chief Regional Officer, British Railways, Western Region, when, at Paddington Station on September 11, Bogdan Karabuha, a lengthman who lives at Malvern Hall Hostel, Worcester, was presented with a certificate and a cheque in recognition of his action. On June 23, whilst working with Lengthman Kania on the Stoke Works branch line near Droitwich, Lengthman Karabuha saw a passenger train approaching at speed. He immediately warned his colleague, who apparently became confused and stepped in the path of the oncoming train. Lengthman Karabuha seized him and although he succeeded in pulling him to the edge of the sleepers by the time the train reached them, he was knocked out of his grasp by the engine and sustained fatal injuries. The action of Lengthman Karabuha involved great personal risk, emphasised by the fact that the leg of his trousers was marked by the engine in its passing. Mr. H. E. Hedges, General Assistant to the Chief Regional

Diesel Haulage in South Australia



Photo]

[G. Bakewell

Double-headed diesel-hauled freight train on the Serviceton-Adelaide main line of the South Australian Railways, approaching the heavy gradients of the Adelaide Hills

OFFICIAL NOTICES

CORAS IOMPAIR EIREANN

TENDERS invited for the supply of the following Diesel Electric or Diesel Hydraulic Locomotives:

- Item 1. 50 Mixed Traffic bogie type locomotives capable of running up to a maximum speed of 75 m.p.h. of 1,100 to 1,400 brake horse power at the continuous rating. These locomotives may be offered fitted with one engine, or alternatively, with two engines each of half the total horse power and each with its own electric or hydraulic transmission.
 2. 40 Mixed Traffic bogie type locomotives capable of running up to a maximum speed of 75 m.p.h. of 550 to 700 brake horse power at the continuous rating and to be suitable for continuous shunting work.
 3. 15 bogie type or alternatively rigid frame type locomotives capable of running up to a maximum speed of 40 m.p.h. in high gear and 20 m.p.h. in low gear of 250 to 350 brake horse power at the continuous rating.
- Items 1 and 2 are to be fitted with through control to allow any two locomotives of either size to be operated as a single unit.
- Manufacturers of Diesel Locomotives desiring to tender can obtain copies of the specification, conditions of tender and contract on application to the Chief Mechanical Engineer, Coras Iompair Eireann, Inchicore Works, Dublin.
- The application is to be accompanied by a cheque for £5, payable to Coras Iompair Eireann in Dublin, which sum will be returned to bona fide applicants.
- Tenders in sealed envelopes are to be received by the Secretary, Coras Iompair Eireann, Kingsbridge Station, Dublin, Ireland, not later than 11 a.m. on Monday, 2nd November, 1953.

INTERNATIONAL RAILWAY ASSOCIATIONS.

Notes on the work of the various associations concerned with International traffic, principally on the European Continent. 2s. By post 2s. 2d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

LONDON TRANSPORT require Senior Assistant, office of Assistant Civil Engineer (Permanent Way), to take charge of section concerned with railway track design of layouts and components, surveys for track maintenance, preparation of specifications and recording. Full knowledge and experience of all aspects, including use of Hallade recording instruments essential; general experience of railway track maintenance in British Isles and corporate membership of Institution of Civil Engineers desirable. Salary range £935 to £1,035; prospects of advancement to £1,135; medical exam.; contributory superannuation scheme after probation. Applications within 14 days to Staff Officer (F/EV 255), 55 Broadway, S.W.1. For acknowledgment enclose addressed envelope.

RAILWAY MAINTENANCE PROBLEMS. By H. A. Hull (late District Engineer, L.M.S.R.). Valuable information. With much sound advice upon the upkeep of permanent way. Cloth. 8s. in. by 5s. in. 82 pp. Diagrams. 5s. By post 5s. 3d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

RAILWAY MECHANICAL ENGINEER required by manufacturers of specialised equipment used in all types of motive power and rolling-stock. Training of approximately two years' duration would be given with a view to employment as sales engineer. Preference given to university graduate, under 30 years of age, who has served apprenticeship with a railway. Salary during training approximately £550, depending on qualifications.—Box 940. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

N.E.R. HISTORY.—Twenty-Five Years of the North Eastern Railway, 1898-1922. By R. Bell, C.B.E., Assistant General Manager, N.E.R. and L.N.E.R. Companies, 1922-1943. Full cloth. Cr. 8vo. 87 pages. 10s. 6d.—*The Railway Gazette*, 33, Tothill Street, London, S.W.1.

The engagement of persons answering Situations Vacant advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive, or a woman aged 18-59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

WORKS MANAGER required for old-established Rolling Stock Works in East specialising in production of all steel railway vehicles. Commencing salary equivalent to £173 monthly. Provident Fund, free house, car, medical attention and passage for family. Applicants, who should have had experience in similar capacity, should apply, in writing, to Box 955, *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

THE PERUVIAN CORPORATION have the following vacancies on the railways in Peru:—Central Railway. **TRAFFIC LEARNER.** Single. Between 21 and 25 years of age. Good general education, with transportation experience either practical or theoretical. **ASSISTANT ENGINEER (CIVIL)** for Railway Drawing Office duties including Bridge and General Structural Steel Work Design, also Reinforced Concrete Structures. Must have sound technical training, preferably with previous railway experience. Age 30/35. A knowledge of the Spanish Language is preferable in both these appointments or willingness to learn within 6 months. Apply: SECRETARY, 144, Leadenhall Street, London, E.C.3.

BOUND VOLUMES.—We can arrange for readers' copies to be bound in full cloth at a charge of 25s. per volume, post free. Send your copies to the SUBSCRIPTION DEPARTMENT, Tothill Press Limited, 33, Tothill Street, London, S.W.1.

Officer, and Mr. E. C. Cookson, Assistant Civil Engineer who deputised for Mr. G. R. Smith, Civil Engineer, were also present at the ceremony.

British Railways Coal and Steel Carriages.—Some 349,000 tons of deep-mine and open-cast coal were cleared by British Railways in the 48 hrs. ended 6 a.m. on September 14, bringing the total for the week up to 3,087,000 tons. During the week ended September 5, 222,000 tons of iron and steel from the principal steelworks, and 322,000 tons of iron ore were conveyed.

Additional Sleeping and Refreshment Car Facilities in London Midland Region.—The winter timetable of the London Midland Region, which comes into operation next week, includes 19 more buffet car services and seats reservable in 405 trains, five more than last winter. During each weekly period there will be eleven additional sleeping car services. The improved third class sleeping cars, with double-berth compartments, full bedding and washing facilities, will be available in many of these trains.

Heavy Passenger Traffic on British Railways.—Last week-end British Railways carried 141,000 passengers from the principal London termini in 499 long-distance trains on Saturday; 43,000 passengers to Blackpool, Morecambe, and Southend to see the illuminations on Saturday and Sunday; 5,700 passengers to Doncaster in 15 special trains for the St. Leger race meeting, and 60,000 to Farnborough, Aldershot, and North Camp Stations for the Farnborough air display.

Difficult Trading Year for Pinchin, Johnson & Associates Limited.—The Chairman of Pinchin, Johnson & Associates Limited, Mr. G. R. T. Taylor, has stated in his report that during the year ended March 31, 1953, reduced demand caused the net profits of the parent company and subsidiaries, after all charges other than taxation, to fall to £1,256,400,

against £1,773,372 for the previous year. Because of the possibility of future stock depreciation and of the continuation the directors proposed a final ordinary dividend of 12½ per cent less tax, making a total of 20 per cent less tax for the year, which proposal was adopted on September 9 at the annual general meeting.

Burry Port-Cwmawr Branch to Close.—British Railways, Western Region, announce that the passenger train service between Burry Port and Cwmawr will be permanently withdrawn from September 21. Serving the Gwendraeth Valley, the branch is 13 miles long, and with the withdrawal of the passenger train service, a number of stations and halts will be closed including Burry Port (adjoining Pembrey & Burry Port on the South Wales main line) and Cwmawr. Alternative services are provided.

New Drainage to be Installed near Harrow.—British Railways, London Midland Region, announce that installation of a new drainage system between Harrow and Wembley will necessitate alterations in the electric suburban service next Sunday, September 20, and for the following 37 Sundays. Electric trains from Euston and Elephant and Castle will terminate at Wembley Central, and those from Watford at Harrow and Wealdstone. Steam trains and special buses will convey passengers between the two points, serving Kenton, South Kenton, and North Wembley. Baggage, bicycles, and so on will be conveyed by a special parcels van service.

Increased Final Dividend by Saunders Valve Co. Ltd.—A final dividend of 14 per cent is to be paid for the year ended April 30 by Saunders Valve Co. Ltd., making a total dividend for the year of 20 per cent. The final dividend for last year was 18 per cent. After providing £30,000 for contingencies and deferred repairs, the group net profits amounted to £229,603 as against £211,114 for the previous year. Taxation required £166,586, leaving an available profit of £63,017 of which £3,360 is retained in the subsidiary.

Nothing has been placed to reserve for future income tax, but £35,000 has been transferred to general reserve. Dividends require £27,125 and £4,314 is carried forward.

B.I.C.C. Cable Sealing Sleeves.—British Callender's Cables Limited has developed a range of polychloroprene sealing sleeves for terminating cables used in normally dry conditions, where sealing by the more orthodox method of considered unnecessary. The sleeves have been developed for use on medium voltage, two- and three-core, cambric-insulated cables, and are particularly suitable for ship wiring. The range is to be extended, to cater for mass-impregnated non-draining power cables for industrial installations generally. The sealing sleeve, which is fitted over the prepared end of the cable is a consideration, and where the more complete protection afforded by a compound-filled box is not warranted.

Automatic Left Luggage Offices at Liverpool Street Station.—The first automatic luggage lockers to be introduced in the Eastern Region of British Railways is now in service at Liverpool Street Station, where a total of 32 have been installed. The lockers are made of steel and fixed in units of 8. By placing sixpence in a slot a passenger obtains the key to a private locker in which he may deposit his luggage and withdraw it any time within 24 hr.; after this period the luggage is removed to the left luggage office, where the passenger can claim it by producing the numbered key.

Proposed Capital Increase by Associated Electrical Industries Limited.—The Directors of Associated Electrical Industries Limited have declared an interim dividend to be paid on October 20, 1953, on the £8,870,596 ordinary stock of the company at the rate of 7½ per cent actual, less income tax at 9s. in the £, in respect of the financial year ending December 31, 1953, the same as for the previous two years. Proposals, together with the necessary resolutions, will be

submitted to stockholders at an extraordinary general meeting of the company to be held on October 8, 1953, that the capital of the company be increased to £28,000,000 by the creation of 6,000,000 ordinary shares of £1 each and 4,000,000 unclassified shares of £1 each. Another proposal will be that reserves and undistributed profits of £8,870,596 be capitalised and applied in paying up in full 8,870,596 unissued ordinary shares, and that such shares be distributed, credited as fully paid, to holders of ordinary stock on the basis of one new share for every one pound of ordinary stock held.

Ransomes & Marles Bearing Company Distribution.—In recommending a final dividend of 12½ per cent and a bonus of 5 per cent, to June 30, 1952, the Ransomes & Marles Bearing Co. Ltd. is making a total distribution of 25 per cent for the year, the same as in 1952. The final and bonus repeat the 1951-52 rates. Untaxed profit for the group decreased by £51,600 to £1,004,338. Group net profits, after taxation of £414,757 and depreciation of £257,151, were £332,430 as against £338,439 last year. Net profits of the holding company were £301,928, as against £302,604; general reserve is allocated £100,000, the same as the previous year and to special pension fund trustees £10,000 was allocated, the same as in the previous year. The amount carried forward was £1,836 as against £208,533.

Forthcoming Meetings

- September 18 (Fri.).—Institute of Traffic Administration, Merseyside Centre, at the Stock Hotel, Queens Square, Liverpool, at 7.30 p.m. Paper on "Airline Management, Passenger and Freight Handling," by a representative of the British European Airways.
- September 18 (Fri.).—The Railway Convalescent Homes. Re-opening of the Convalescent Home, Ardenlea, Queens Drive, Ilkley, Yorks., by Sir John Benstead, C.B.E., President of the Homes, and Deputy Chairman, British Transport Commission, at 3 p.m.
- September 19 (Sat.).—Centenary of Doncaster Plant Works, 1853-1953, and Exhibition of Railway Rolling Stock. Exhibition to be opened by Mr. R. A. Riddles, Member, Railway Executive, at 11 a.m.
- September 23 (Wed.).—Institution of Locomotive Engineers, at the Institution of Mechanical Engineers, Storey's Gate, London, S.W.1, at 5.30 p.m. Presidential address.
- September 23 (Wed.).—East Indian Railway Officers' Association, at the Connaught Rooms, Great Queen Street, Kingsway, London, W.C.2, at 6.30 p.m. for 7 p.m. Fiftieth Annual Dinner.
- September 24 (Thu.).—East Indian Railway Officers' Association, at St. Ermins Hotel, Caxton Street, London, S.W.1. Reunion Tea Party for members, their wives, and families.
- September 24 (Thu.) to September 26 (Sat.).—Rugby Engineering Society Jubilee Exhibition at the College of Technology and Arts, Rugby.
- September 24 (Thu.).—Institute of Traffic Administration, Glasgow Centre, at the Kenilworth Hotel, Queen Street, Glasgow, at 7 p.m. Paper on "National Distribution," by A. MacNair.
- September 24 (Thu.).—Irish Railway

- Record Society. Annual General Meeting in the Lounge of the C.I.E. Club, Earl Place, Dublin, at 7.45 p.m.
- September 26 (Sat.).—Permanent Way Institution, London Section. Visit to Redbridge Sleeper & Creosoting Works, British Railways, Southern Region.
- September 28 (Mon.).—Historical Model Railway Society. Illustrated talk by Mr. F. C. Hambleton: "Photos taken at random from my Collection," at the headquarters of the Stephenson Locomotive Society, 32, Russell Road, W.14, at 7 p.m.
- September 30 (Wed.).—Institute of Traffic Administration, Preston Centre, at the Victoria & Station Hotel, Preston, at 7.30 p.m. Paper on "Road Haulage," by Mr. A. Miller.
- October 1 (Thu.).—British Railways, Western Region, Lecture & Debating Society, in the Headquarters Staff Dining Club, Bishop's Bridge Road, Paddington, W.2, at 5.45 p.m.

Speaker: Mr. Alan Lennox-Boyd, Minister of Transport.

- October 2 (Fri.).—Railway Club, 57, Fetter Lane, London, E.C.4, at 7 p.m. Paper on "Some Railway Personalities," by Mr. G. Royde Smith.
- October 2 (Fri.).—The Scottish Society of Students of the Locomotive, at 302, Buchanan Street, Glasgow, C.2, at 7.15 for 7.30 p.m. Annual General Meeting.
- October 3 (Sat.).—Electric Railway Society, at Fred Tallant Hall, 153, Drummond Street, London, N.W.1, at 3 p.m. "The Electric Railways of Merseyside," by Mr. R. K. Kirkland.
- October 4 (Sun.).—The Railway Correspondence & Travel Society, East Sussex Rail Tour. Leaving Three Bridges Station at 1 p.m.
- October 5 (Mon.).—Institute of Transport, at the Jarvis Hall, 66, Portland Place, London, W.1, at 5.45 p.m. Presidential Address by Mr. John Elliot, Chairman, Railway Executive.

Railway Stock Market

The main factor affecting stock markets this week has been the fresh fall on Wall Street and fears that the downward trend at that centre may continue for a time. A waiting attitude has prevailed over here, though little selling developed. Because of a falling-off in demand, some industrial shares prominent a week ago have reacted moderately, and speculative interest has tended to switch to foreign bonds, among which German, and to a lesser extent Japanese, were prominent.

British Funds were outstandingly strong, with War Loan 3½ per cent up to £83½, a new peak level for the current year. Gilt-edged stocks are regarded as the best safety first holding for the time being until the market outlook is more settled, and they have an added attraction, namely that holders will be able if they so desire to exchange into steel shares at prices to be fixed when the various steel issues are made. Despite the present uncertainty, however, it is assumed in many quarters that markets will develop renewed strength shortly. Many industrial shares remain in short supply in the market because there has been little selling in recent months. Consequently moderate demand could very well result in a sharp advance in prices.

Foreign rails have attracted a fair amount of attention, with United of Havana outstanding again in response to market estimates of the break-up values of the various stocks based on the preliminary agreement with the Cuban Government for the sale of the Cuban properties for the equivalent of £4,642,800. Unless there is a hitch, the agreement is expected to be signed within 90 days, and a distribution on the "A" and "B" United of Havana stocks is looked for before the end of the year. Claims against the company will have to be settled, but if these cannot be agreed quickly, the market view is that interim distributions on the stocks could very well be made in the meantime. It is confidently assumed that both the "A" and "B" stocks will be repaid at par. At the time of going to press they have both advanced further to 90, while the 5 per cent second income stock has risen to 35½ and the consolidated stock has changed hands around 5½.

Manila Railway debentures have remained more active and were higher on balance with the "A" at 81½; the preference shares changed hands at 8s. 6d.

Antofagasta stocks became less active after their recent advance: the ordinary was 10 and the preference 51.

Mexican Central "A" debentures were 82½, Nitrate Rails shares were 20s. 9d., and San Paulo units 5s. 6d.

In other directions Chilean Northern first debentures have changed hands up to 27½, and there was rather more business in Dorada ordinary stock up to 57½.

Costa Rica ordinary was dealt in around 11½ and the 6½ per cent second debentures at 53½. Taltal shares marked 13s. 9d.

As expected, the Wall Street fall affected Canadian Pacifics, which were down to 542½, though the 4 per cent preference stock strengthened to £67½ on Canadian buying, and the 4 per cent debentures have been firm at £85½. White Pass no par value shares declined further to \$25 and the convertible debentures to £91.

There was again firmness in road transport shares with Southdown at 32s., West Riding 37s. and Lancashire Transport 51s. Potteries Motor Traction changed hands at 27s. B.E.T. deferred 5s. units have shown activity around 29s. 4½d.

The wage claims kept engineering shares quiet, though Guest Keen strengthened to 51s. 3d., Vickers have been steady at 50s., while Cammell Laird 5s. units at 12s. 3d. responded to the higher interim dividend, though the increase in the latter has been made merely to lessen the disparity between the interim and final payments. The market realises that it cannot be assumed the year's total will be increased, but it is being assumed that the higher interim is an indication of confidence in the future.

Tube Investments at 60s. 9d. were firm on the latest acquisition made by the company, which is another step in broadening the basis of the group's activities and interests. T. W. Ward have been firm at 75s. 3d., George Cohen 5s. shares at 9s. 3d. remained under the influence of the results. Babcock & Wilcox were 65s. 9d. and Ruston & Hornsby 39s. 6d. Renold & Coventry Chain also changed hands around 39s. 6d.

Elsewhere, Beyer Peacock were 34s. 3d., Birmingham Carriage 28s. 9d. and North British Locomotive 12s. 6d. Hurst Nelson turned easier at 42s. 9d. at Glasgow. Vulcan Foundry were 20s. 3d., Gloucester Wagon 10s. shares 13s. 9d. while Wagon Repairs 5s. shares were 14s. 10½d. and Charles Roberts 5s. shares 16s. 3d.